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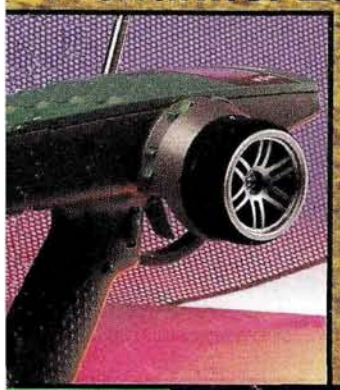

TESTED
- Team Losi **Triple-XNT**
- Associated **Factory Team RC10T3**
- Neo **T-21 M**
- Tamiya **XB Pajero Rally Sport**

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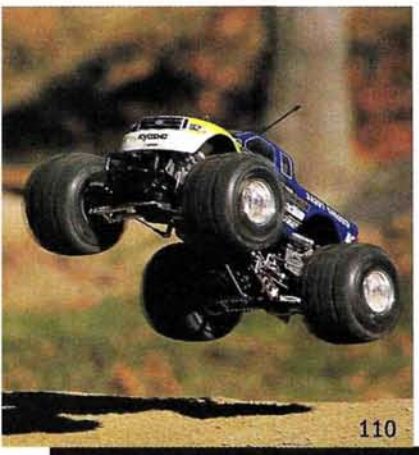
contents

Volume 16 ■ Number 2 ■ February 2001

features


110

110 Project: Kyosho USA-1
Making the most of Kyosho's monster
by Greg Vogel

119 Factory Rides
Pro setups you can use
by the staff of *RC Car Action*

144 Pro-Line Endless Summer Classic
A race to remember
by Greg Vogel

156 Product Probe: Multiplex Profi Car 403 & 707
Set for stun
by Peter Vieira


119

164 How To: Dial-in your Rebuildable Stock Motor
Trinity's Jim Dieter shows you how
by Kevin Hetmanski

156


133

DEPARTMENTS

22 Starting Line

26 Readers Write

44 Readers' Rides

186 Product Watch

212 RC Store

216 Featured manufacturer and advertiser information

COLUMNS

35 Inside Scoop
by Chris Chianelli

52 Pit Tips
by Jim Newman

58 Troubleshooting
by Peter Viera

133 Racer News
by Greg Vogel and Derek Buono

174 Piston Power
by Chris Chianelli

204 4x4
by Kevin Hetmanski

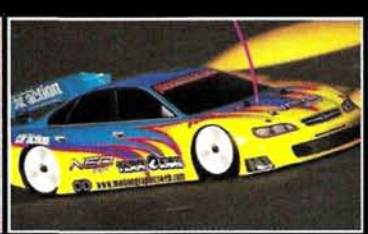
218 Chris's Back Lot
by Chris Chianelli

ON THE COVER (from top) Project Kyosho USA-1; Multiplex Profi Car 707 transmitter. Photos by Walter Sidas.

track tests

68
Team Losi Triple-XNT
Fast laps with Losi's latest nitro rig
by Derek Buono

80
Associated Factory Team RC10T3
The A-team's ultimate electric truck
by Kevin Hetmanski



88
Neo T-21 M
Neo makes an electric touring bid with a mid-motor machine.
by Robert Allgeyer

100
Tamiya XB Pajero Rally Sport
Ready-to-run gets real
by Peter Vieira

Everybody loves a winner

It's 2 a.m., and it looks like I forgot to go to bed. You know how it is when you're at the bench getting a car together; there's always one more step to finish off before you call it a night. "I'll just assemble the turnbuckles, and that's it," soon becomes, "Well, I may as well build a shock just to see how the suspension feels," which leads to, "What the heck—I'll build all four." Next thing I know, I'm mounting tires, soldering Schottky diodes and zip-tying wires. That gets me to 2 a.m., with a stiff neck, a big smile and a race-ready car.

At this moment, my car is unbeatable. It has unlimited performance potential. Tomorrow, on the track, who knows how I'll do?... but right now, I'm the fastest guy on the carpet. The hours spent after the car is finished but before it takes its first lap are when an RC car is at it's undisputed best; not even I can say how well it really runs until I run it, but in my imagination, it's winning the A-main. There's only one way it can get even better—and that's by actually winning the A-main.

Or winning the B-main. OK; top five in the B-main .... I'm not picky. No matter how you define a good day at the track, a good day at the track only increases the affection you feel for your car—at least, if you're anything like me. When my car does well, it rides home on the front seat. I wouldn't throw my good buddy into the trunk with my pit box and extension cord! At red lights, I can't help but pick it up and check it out, already planning what I'll do with my next bench session. I might even talk to it: "Looks like you chunked a tire; we'll fix that right up. Uh-oh, your ESC came untaped—no biggie ...." Then a honk from the guy behind me lets me know the light is green, and I'm off again. When I get home, I head straight for the workshop. All I really want to do is blow off the tire dust, but I may as well replace that chunked tire. And as long as the body is off, I can retape that ESC. Hmmm ... the diff feels a bit gritty ... and the next thing I know, it's 2 a.m. once again.

So I have to wonder whether Steve Slayden and Paul Lemieux drove their winning cars home in the front seat, or if Yuichi Kanai took his world-champion Inferno MP-7.5 back to Japan as a carry-on (you can check out all three of their factory machines in "Factory Rides," page 119), and I wonder whether they enjoy that perfect-car, prerace anticipation as much as I (and I hope you) do. Whether or not they do, only they can say; but I'm sure Steve, Yuichi and Paul will agree, there's no better car than a winning car.

Peter Vieira
Executive Editor

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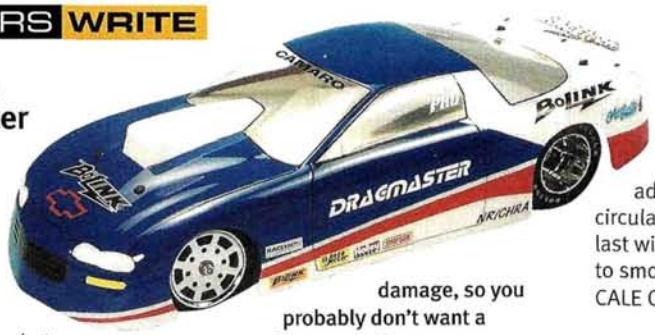
Building a Nitro-Beater



I'm thinking about getting an Associated RC10L30 and running it with a custom 8-cell pack. How fast will it go? I have a bet with a friend that I can get an electric car to go faster than his Super RS4. He's giving me only two tries. I've seen how fast his car goes—around 55mph. Will the RC10 be able to go faster? If so, how many winds and turns do I need for the motor? I'm only 13 and don't have the money to experiment with different motors, so it would be great if you could respond. Thanks a bunch. [email]
DAVID SU

I built a Bolink dragster that topped out at a little over 40mph with a single stick pack and a Trinity Speed Gems Garnett 13x1 motor, and it did 65mph with two stick packs on board (read about it in the December 1999 issue). As long as you can get the power down, your 8-cell L30 would probably reach the 55mph mark fairly easily if you run a motor in the 10-turn range, provided you can keep the car on the ground. Do you want an oval car for any other reason than speed? Because if pure speed is all you're after, Bolink's electric drag cars are a ton of fun, and they're dirt cheap. Remember, a crash at 60mph will do some damage, so you probably don't want a speed-run car to be any more expensive than it has to be.
—Pete

Can't Choose

I picked up *Radio Control Car Action* because I wanted a car; now I can't decide between an electric or nitro-powered car. I saved my money, and I want something that I can tweak to make it awesome. I'm leaning toward an electric because I don't want to use up fuel and go buy more. What should I do? [email]
DANIEL HAAK

Go to the local hobby shop or track to check out both types of cars in action; you may be willing to deal with regular visits to the shop for fuel after you see a nitro truck in action, or you might be totally into electrics after you see a touring car tear up the parking lot. I've yet to come across a type of RC vehicle that wasn't fun, so there's no "wrong" choice here.
—Pete

Mad Scientist

I'm 13 years old and have been getting your magazine for about 4 or 5 years. Is there any way to put a Losi or Associated front end on an MRC Vortex? I made a sprint car out of it so far and have added bearings to it. I made a circular dirt track in my backyard last winter and am currently trying to smooth it out. [email]
CALE OLSON

Well, Cale, you can pretty much make anything fit anything, if you really want to, but I don't think it would be worth the cost of a new Losi or Associated front suspension system to hack it up for your Vortex; in the end, you'll still have a lower A-arm/upper camber-link system, and in sprint-car mode, I doubt you would see any benefit. But that doesn't mean you can't try it! Keep tinkering; that's what RC is all about.
—Pete

You're Sorta Right ...

In the December 2000 issue, you guys said that the Schumacher Cat driven by Masami was the first 4WD world champ in 1987. What about Gil Losi Jr. driving a Yokomo in 1985 at Del Mar? Jay Halsey was the 2WD champ, and Gil was the 4WD champ. [email]
CURTIS STRAWN

In 1985, there was a 2WD class and an "open" class that combined 2WD and 4WD, and you're right; Jay won 2WD with an RC10, and Gil Losi Jr. won the open class with a Yokomo Dogfighter. In fact, we featured the cars in the December 1999 issue. In the "Head to Head: Schumacher CAT 3000 vs. Team Losi Double-X4 Worlds" article, I explained that Masami won the first 4WD worlds title after IFMAR made 2WD and 4WD separate classes, in 1987. So we're both right, depending on how you define "first 4WD world champion." Gil was certainly the first to win a world championship with a 4WD car, but Masami was the first 4WD world champion.
—Pete

Goof Alert

Hey guys, you goofed. The Sport Peak Charger Guide lists the LRP Micro Charger and Dynamite Vision Peak Charger as NiMH-compatible, but they aren't. If you want to charge a NiMH pack with them, you should monitor the pack's temperature and take the pack off when it starts to warm up. Just thought you should know! [email]
ERIC MERTIN

Yep; we incorrectly gave each charger a "yes" in the "NiMH-compatible" column. Your charging advice makes sense, but we've heard that by the time you can detect any heat through a NiMH cell's shrink-wrap, its interior is already hot enough to cause the cell's performance to deteriorate. As more chargers become available with NiMH modes, I think the best advice is to simply get the proper charger.
—Pete

YOU SAID IT

"Needless to say, I was a little embarrassed when I pulled out my 'sport' peak charger."

After five years away from RC, I rejoined the hobby. I race at a track here in Indianapolis, and at first I felt out of place because all drivers had power supplies with $300 chargers, and several had lathes. One gentleman even had a laptop with a program to aid in figuring rollout. Needless to say, I was a little embarrassed when I pulled out my "sport" peak charger.

The man with the laptop, Mike Strickland, came over and started talking to me about my car. Turns out we were in the same class. He noticed that my car had a stock motor, and that is when I found out that they race 19-turn modifieds. I asked whether he thought that I should buy a new motor so I could try and "hang" with the other cars. What came next was the best thing that could have happened to me.

On his laptop, Mike helped me figure out how to make my stock car run as fast as possible so I wouldn't have to get another motor, and he even told me the gears I needed for the ratio the program suggested. I did race against the mods and they did blow me away; but I got some much needed track time, and I felt much better about being there.

Fortunately for this track, Mike is not alone in his generosity with RC knowledge. Getting back into any sport is not easy when you must keep up with technological advances, and the racers and staff at Hobbytown USA have been very helpful. I want to thank Mike and everyone else for their help.
JASON PEARSON
Westfield, IN

What can I add? Welcome back, and to all you Mike Stricklands out there—keep on being the cool, experienced guys every good track needs to keep the new (or returning) guys rolling. Here's a Hudy T-shirt.
—Pete ■

Jason gets himself this snazzy T-shirt for writing in. It's a Hudy, so it's precision CNC-machined.

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

EMAIL ■ Derek Buono: derekb@airage.com ■ Chris Chianelli: chrisc@airage.com ■ Bob Hastings: bobh@airage.com ■ Kevin Hetmanski: kevinh@airage.com ■ Steve Pond: stevep@airage.com ■ Peter Vieira: peterv@airage.com ■ Greg Vogel: gregv@airage.com

BY CHRIS CHIANELLI

RC CAR ACTION TAKES ON TRAXXAS IN FASTEST TRUCK SHOWDOWN

While cruising the aisles of the Chicago hobby show (covered in last month's special edition of "Scoop"), we ran into Brent Byers at the Traxxas booth. If that name rings a bell, it's because Brent is the designer of the T-Maxx and the E-Maxx, and he was interviewed in the December issue. Anyway, Brent complimented assistant editor and Swabmeister Greg Vogel on his many "Project" vehicles and threw down a challenge: ol' Brent says he can put together an E-Maxx that will be faster than any nitro truck Greg can build—including Greg's dual-.21-powered Double Trouble USA-1! Never one to shy away from a challenge, Greg is keeping Double Trouble on the shelf and building an all-new, even faster T-Maxx just for the speed-run project. Greg and Brent will run the trucks at a soon-to-be-announced nitro event, and we'll have an in-depth report on both machines.

THE RULES: if you'd like to see the rules that Greg and Brent have agreed on for the "Maxx Speed Showdown" (I just made up that name!), click over to www.rccaraction.com.

GS RACING
Nitro Monster Prototype

GS doesn't have the final specs on its new monster truck project, but I can tell you it's based on the Storm 1/8-scale buggy and features a trick reversing tranny; the unit takes the place of a center diff and actually senses rpm. Reverse is engaged only after the transmission has stopped rotating and the trigger is held full up; then the throttle will engage the tranny in reverse. No word yet when the truck will be available.

And while I'm on the topic of GS Racing stuff, I'll let you know that GS is shipping its Sonic RTR 1/8-scale on-road cars, so look for a test soon. The Sonic isn't totally ready to run (it doesn't include a radio), but it is fully assembled with a clear body and installed .21 RO1 engine with manifold and pipe. The Sonic has all the racing features you would expect of an on-road machine, including 4WD, quick-release wheels, 2-speed transmission, 3-shoe clutch and a CNC'd aluminum chassis. This could be the car to bring 1/8-scale on-road to "everyday" RC guys; I can't wait to try one!

GS Racing, 650 W. Duarte Rd., Ste. 205, Arcadia, CA 91007; (626) 445-6036; www.gsweb.com.tw.

TRINITY SNEAKS SOME POWER OUT THE BACK DOOR
Trinity Picco P12 and P15 rear-exhaust engines

Picco has introduced new, more powerful rear-exhaust versions of the P12 and P15 series small-block engines. They feature a new block design formed with new casting technology for higher quality. Other features include an aluminum-finish crankcase, a purple-anodized cylinder head, a connecting rod that's reinforced (to handle the power output) and a slide or rotary carb. High-output manifolds designed specially for these power-plants are sure to maximize power output. Trinity Products Inc., 36 Meridian Rd., Edison, NJ 08820; (732) 635-1600; www.teamtrinity.com.

NEW HARDCORE CHASSIS

Hardcore Racing has some of the best-finished aluminum and titanium parts going, as these pictures attest. Who wouldn't want a full-Hardcore T-Maxx? That thing is awesome! Also pictured are Hardcore's chassis for the HPI Super Nitro RS4, Yokomo GT-4W, Serpent Impulse and Mugen MTX-2; all are precision CNC-machined from titanium for incredible strength.

Hardcore Racing Components, 25435 Rye Canyon Rd., Valencia, CA 91355; (661) 294-5032; fax (661) 294-0770; www.racinghardcore.com.

Traxxas T-Maxx

Yokomo GT-4

Mugen MTX-2

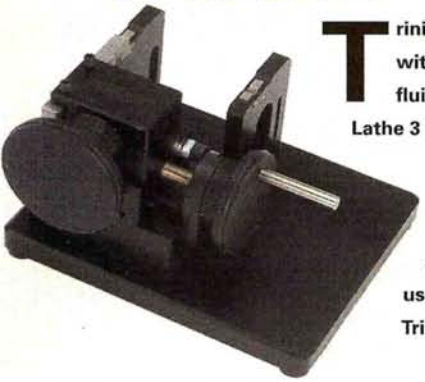
HPI Super Nitro RS4

PARMA KEEPS ON TRUCKIN' ...

... and "ovaling," I guess, since I'm showing off the new Oval Outlaw shell as well. Parma says the 200mm left-turner has even front and rear downforce, and it won at Euclid, OH's, concrete oval its first time out. Now, about those trucks! The officially licensed Monster Jam line includes the Grave Digger no. 12, the latest version of the insanely popular monster truck. You can get it in clear or painted, and the body includes a complete decal set printed on stretchy vinyl for wrinkle-free application. If the Grave Digger isn't your style, you can go with Goldberg, Sudden Impact, or the feline Prowler (or Predator, depending on how you paint and decal it; the body includes graphics for both looks, and there's even a painting "how to" for the Prowler online at www.parmapse.com/tips.asp). All are pulled from tough 0.040 Lexan and include window masks and vinyl decals.

Parma/PSE, 13927 Progress Pky., North Royalton, OH 44133; (440) 237-8650; www.parmapse.com.

TRINITY TRU-LATHE 3



Trinity's third-generation lathe is its best yet. In addition to its snazzy fitted case with foam lining, the lathe includes motor and armature tubes and cutting fluid. Of course, the lathe's features are what's most important, and the Tru-Lathe 3 is full of 'em. It includes steel V-guides and ball-bearing guides, so you don't have to buy one or the other as an option, and a carbide bit is right in the box, so you can start cutting right away. For greater convenience and precision, the cross-slide has been redesigned for smoother action, and the drive motor (not included) is mounted on the right side of the lathe, so you don't have to operate the motor in reverse (reverse running is very tough on the stock motors typically used to drive lathes).

Trinity Products Inc., 36 Meridian Rd., Edison, NJ 08820; (732) 635-1600; www.teamtrinity.com.

FASTER MAXXES

Traxxas isn't wasting any time getting E-Maxx hop-ups out the door. The lightweight input shaft/drive gear assembly with 18/13-tooth top gear, output idler gear shafts and input idler gear shafts are designed to reduce rotating mass inside the gearbox and help produce quicker acceleration and higher top speed. And if you think "lightweight" means "not as strong," don't worry; the parts are hard-anodized and Teflon-coated for low friction.

To trim even more weight, you can try the 32-pitch machined-steel pinion gears that are available in 12- to 22-tooth sizes for a broad range of E-Maxx gearing options. The larger pinion gears are machined to remove unnecessary weight without sacrificing strength.

Last, Traxxas has a little something extra for you T-Maxx racers out there. The forward-only output shaft eliminates the reverse gear (and reverse clutch), forward drive gear (and forward clutch), internal clutch bell, shift fork, shift servo and shift servo horn and linkage from the T-Maxx transmission and replaces them with a single, clutchless forward output shaft and drive gear that reduce weight considerably and make the transmission direct drive for smoother starts. You won't have reverse anymore, but you will have a quicker, more smoothly accelerating truck with more top end. Sounds like racing stuff to me!

New Losi Treads

Razor-Pin, Razor-Rib and T-Bone tires

Team Losi has three new truck tires, and all are available in Red and Silver compounds with foam inserts to fit all 2.2 truck rims. The Razor-Pins are for multiple-surface tracks, the Razor-Ribs work on hard and soft surfaces and are claimed to be extra stable at speed, and the T-Bones are for hot electrics and nitro trucks running on hard or loose surfaces.

Team Losi, 13848 Magnolia Ave., Chino, CA 91710; (909) 465-9728; www.teamlosi.com.

OFNA True Start

I don't usually talk money in "Scoop," but OFNA says the True Start Universal starter box will hit the shops at about $60. That's downright cheap for a no-frills box, but the True-Start definitely packs in some frills. It has a dual-motor belt-drive setup with ball bearings, an externally adjustable switchplate, an on/off switch and plenty of room for a gel-cell battery. And since the True Start is a "universal" box, you can position the starting wheel in line for 1/10 trucks or run it across the box for 1/8-scale machines. Movable chassis-locater pins and a variety of mounting slots should make it easy to custom-fit the True Start to your nitro vehicle.

OFNA, 22692 Granite Way, Ste. B, Laguna Hills, CA 92653; (949) 586-2910; www.ofna.com.

SUV Me! Pro-Line Ford Excursion for Traxxas Maxx

This is the prettiest Maxx body I've seen! Pro-Line's scale-looking Excursion is custom designed for the Traxxas Maxx trucks, but I bet more than a few guys will adapt the shell to trucks with more realistically proportioned tires and wheels. In addition to the usual Pro-Line body stuff (like window masks and decals), the Excursion shell will include extra-long rear body mounts to reach up to the roof panel. Nice.

Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; www.pro-lineracing.com.

Win a $500 gift certificate from DuraTrax! Send a sharp, uncluttered, well-exposed color photo of your vehicle (no Polaroids or computer printouts), and a brief description, to Readers' Rides, *RC Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA. If we publish your photo, you'll receive a free RC Car Action decal sheet and will be eligible to win a $500 gift certificate from DuraTrax in the "Readers' Rides of the Year" contest. Write your address and phone number on your letter and on the back of every photo you send. One vehicle per photo, please. Good luck!

Readers' Rides

Marvin King,
Chattanooga, TN
HPI RS4 Pro 2

This stylin' RS4 is equipped with a Novak Explorer II high-frequency ESC, a Futaba receiver and a Futaba S3003 servo. The HPI racer has a Trinity Midnight Pro 2 stock motor and Sanyo 2000 batteries for power.

Ronnie Bolding,
Arlington, TX
Associated and Traxxas vehicles

Ronnie's first gas truck, the RC10GT on the left, is equipped with an O.S. Max 15CV-X and a JR Racing XR-3 radio. The Traxxas Bandit has a Novak Super Rooster ESC and a Trinity Speed Gems Topaz motor. His Super Rooster-equipped Stampede is powered by a Speed Gems Platinum.

Len and Jake Baggerman,
Albuquerque, NM
Yokomo MR-4TC Pro and Associated TC3

This father-and-son duo includes Len's yellow and red MR-4TC Pro tourer that is equipped with a Novak Explorer II ESC, Trinity Sport Tech batteries and a Futaba Magnum Junior radio. Jake's TC3 has a Tekin G-10 Pro ESC, a JR high-speed, Ultra-Race servo and Trinity 2000 matched batteries.

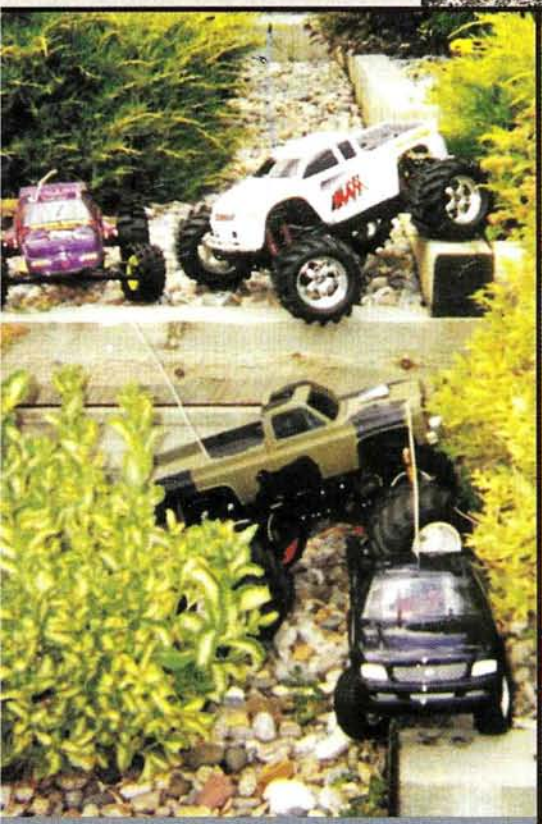
Ryan Kearney,
Brandon, FL
HPI RS4 MT

The gray color scheme gives this HPI RS4 MT a very sinister look. Ryan wanted a more aggressive profile for his otherwise stock truck, so he added wheels and tires from a Traxxas Stampede.

sponsored by DURATRAX

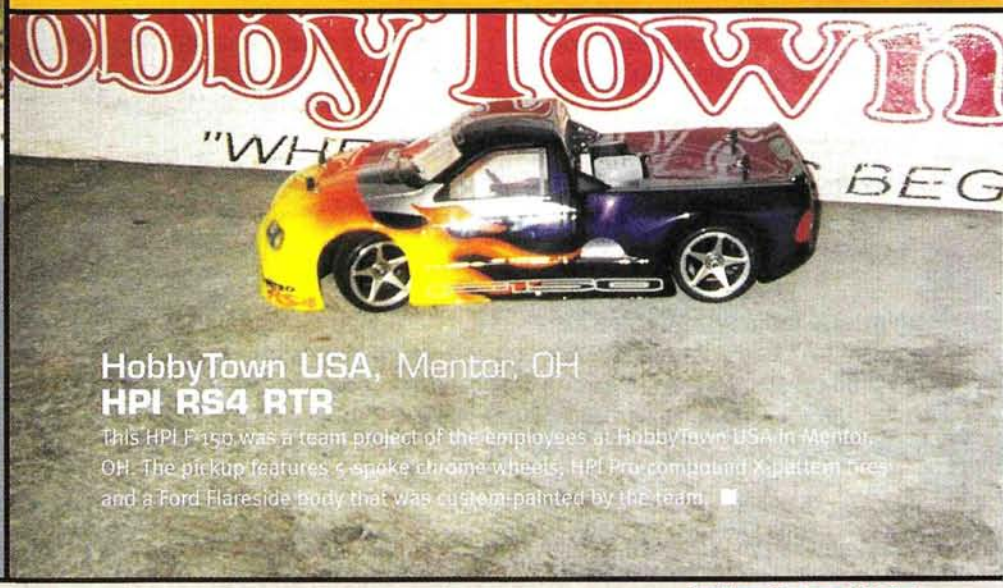
Readers' Rides

Brian Judy, Prosperity, SC
Tamiya M4 Sherman Tank
This scale military marvel has a Futaba T2ER radio along with a Tamiya electronic differential/speed control unit. Brian says he gets well over 20 minutes of run time with Tower Hobbies 1500mAh batteries. Nice job, Brian; this M4 looks ready for some backyard military maneuvers.



Kenneth Price, Brighton, MI
Kyosho, TTR and OFNA vehicles
Here's quite a collection from the Midwest: from the left—Kyosho GP-10 sporting an HPI McLaren D-1 body, TTR Mirage V-Spec, TTR Twister, OFNA Super Pirate, Kyosho Nitro USA-1 and OFNA Pirate 10. Makes you wonder how Ken decides which one to drive.

Chase Watson, Colorado Springs, CO
Tamiya, Losi and Traxxas trucks
Chase's Clod Buster sports a Novak Rooster ESC, and the Losi Double-XT has a Novak Explorer Sport speed control. The three electrics run on Trinity Midnight Pro 2 motors and Pro-Line tires. The T-Maxx is stock.



HobbyTown USA, Mentor, OH
HPI RS4 RTR
This HPI F-150 was a team project of the employees at HobbyTown USA in Mentor, OH. The pickup features 5-spoke chrome wheels, HPI Pro-compound X-pattern tires and a Ford Flareside body that was custom-painted by the team. ■

Pit Tips

ILLUSTRATED BY
JIM NEWMAN

WIN AN OFNA Z-10 RALLY! ***Radio Control Car Action*** **will give a 6-month subscription (or extend an existing subscription) to the author of each idea used in "Pit Tips." "Top Tip" winners receive an OFNA Z-10 Rally kit. All published "Pit Tip" authors receive an OFNA yo-yo. Send a rough sketch to Jim Newman, c/o** ***Radio Control Car Action***, **100 East Ridge, Ridgefield, CT 06877-4606 USA. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one nor return unused material.**

Refurbished FasKolor

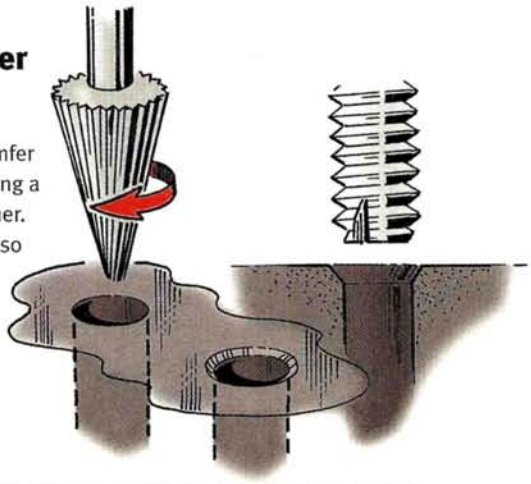
If your FasKolor paint scheme didn't come out as planned, start over! Spray Traxxas Nitro Wash onto the inside of the body, let the spray set for a few minutes and then sponge the paint off. A few applications of spray may be required, but the body will come out perfectly clear.

BRIAN WRIGHT
Braintree, MA

Screw Starter

For easier screw starting in plastic parts, slightly chamfer the hole's edge using a tapered body reamer. The chamfer will also help guide the screw in straight.

DONNA SISTERITA
Branson, MO



Blade Protection

Before you store your hobby knife in your toolbox, turn the blade around so the sharp end faces inward. This way, the blade and tip will remain intact, and it's less likely that someone will accidentally cut themselves on it.

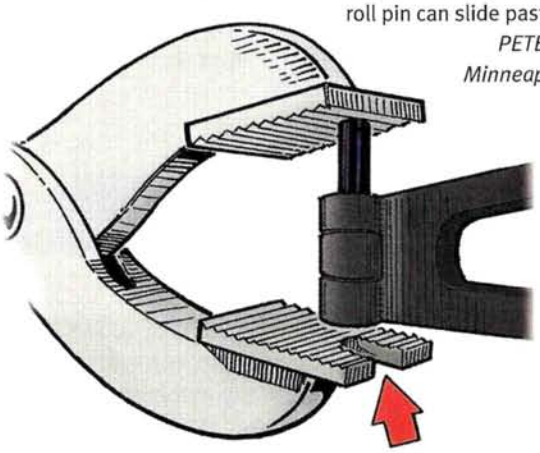
ROBERT DEAN
Athens, OH

TOP TIP

Roll-pin Remedy

You can make roll-pin installation easier by slotting a pair of channel-locks to allow the cross-pin to press through the lower jaw; this way, you can squeeze the pin into place without having to hold the tool at an awkward angle so the roll pin can slide past the jaw.

PETER ALLEN
Minneapolis, MN



Leaner Nitro Sport

The .15 engine on the Traxxas Nitro Sport has a restrictor installed in the carburetor barrel that can cause the engine to run too rich. Remove the black insert, and you'll notice a marked increase in the engine's performance.

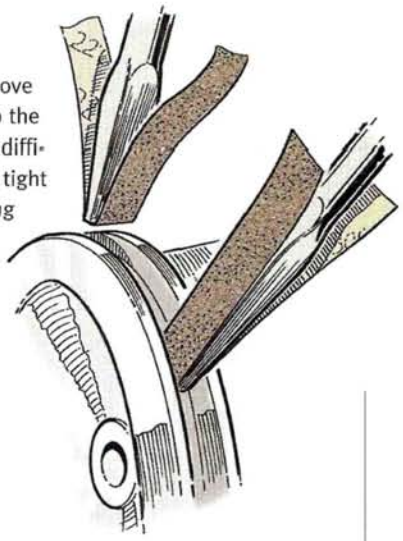
CRAIG TRACHTEN
New Milford, CT

Pit Tips

Chrome Scraper

Everyone knows you have to remove the plating from a chrome rim so the tire glue will stick, but it can be difficult to sand off the plating in the tight space between the tire-mounting flanges. Use a flat-head screwdriver wrapped in sandpaper to remove the plating from the grooved portion of the rim. To thoroughly clean the bead, follow up with a cotton swab dipped in denatured alcohol.

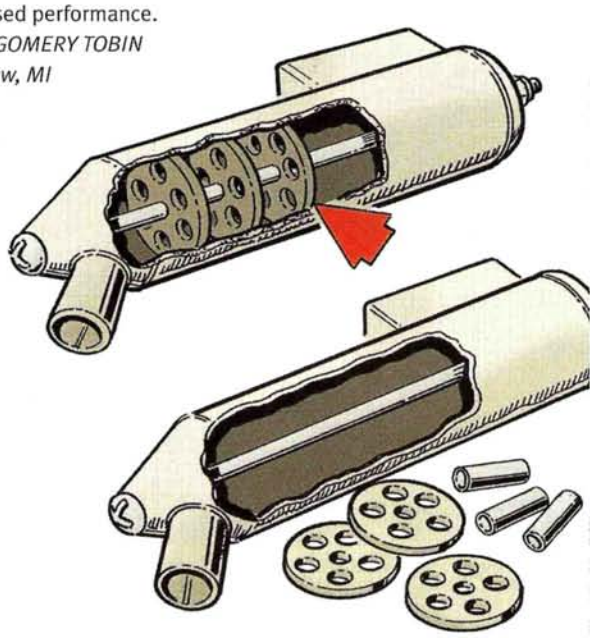
H. T. MONSKY
Roanoke, VA

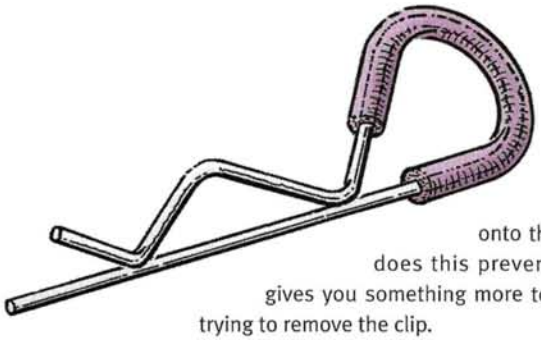


Muffler Modification

The stock exhaust on many vehicles has restrictive baffles that reduce power because of excessive backpressure. Remove the inserts, retune the engine, and you'll find that it runs cooler and has increased performance.

MONTGOMERY TOBIN
Saginaw, MI

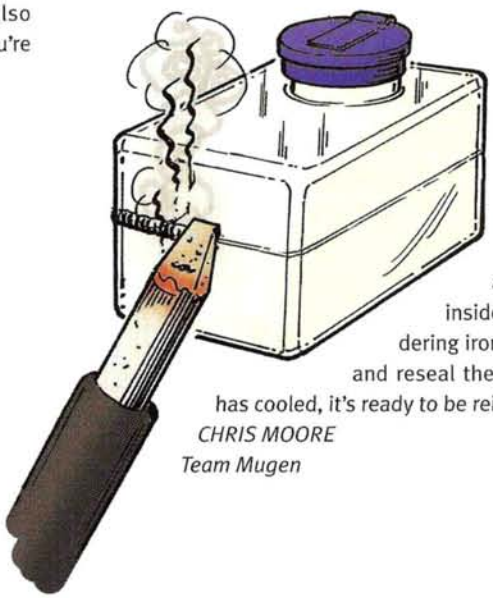




No-chip Clip

Prevent your body clips from scratching your Lexan body by sliding a short piece of fuel tubing onto the loop section. Not only does this prevent vibration, but it also gives you something more to grab onto when you're trying to remove the clip.

PHILIP McCALISTER
Rogers, AZ



Fuel-Tank Fix

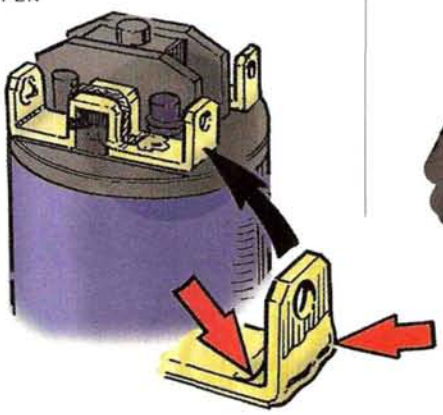
If the seam on your fuel tank has split, here's a trackside solution: remove the tank, and thoroughly clean it inside and out. Run a hot soldering iron down the seam to melt and reseal the plastic. When the tank has cooled, it's ready to be reinstalled.

CHRIS MOORE
Team Mugen

Stronger Motor Tabs

The copper tabs on the P2K and similar Epic-based motors tend to break if overstressed, but here's a simple solution: flow a bead of solder directly behind the crease at the tab's 90-degree bend to reinforce it.

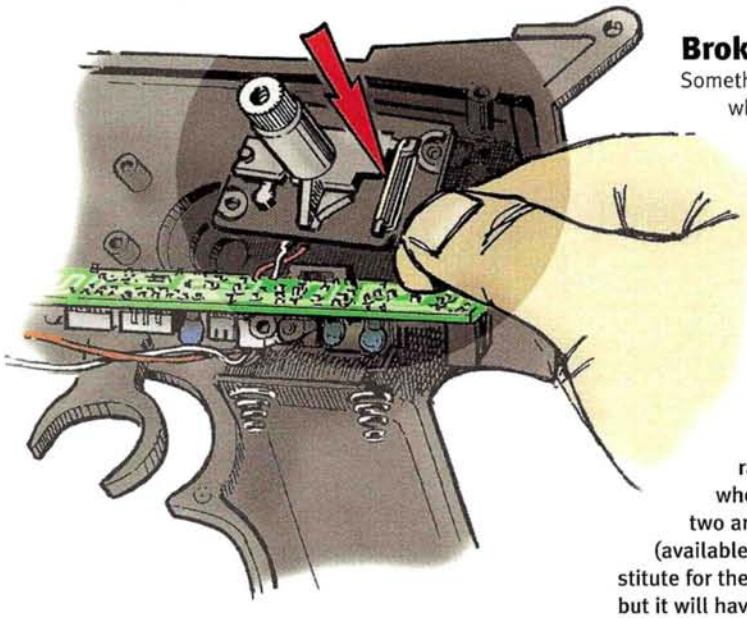
JASON KURTH
Bedford, NY



Troubleshooting

BY PETER VIEIRA • ILLUSTRATIONS BY JIM NEWMAN

If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at *Radio Control Car Action*, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.



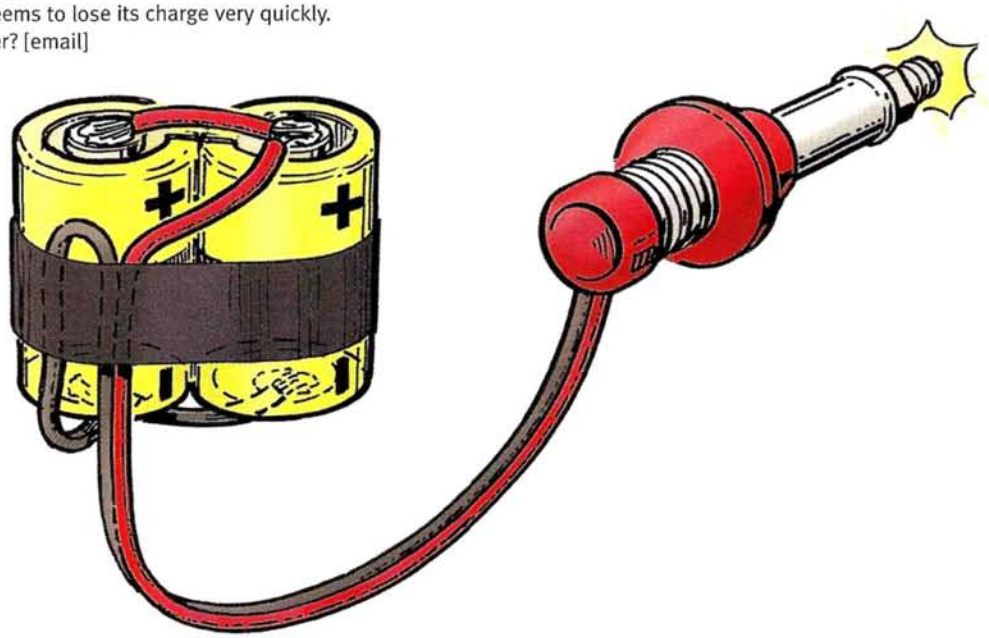
Broken Return Spring

Something funny happened to my radio. While I was driving, the steering wheel wouldn't automatically return to center. What happened? [email]
BOB HILL

All transmitters have a spring mechanism that returns the wheel to center. Sometimes, there are two springs inside—one for each direction on the wheel. These springs can sometimes break, causing the problem you describe. The spring(s) can be replaced but usually must be specially ordered; contact the manufacturer for the correct part number. Until then, it is possible to fix the spring so you can continue to drive your car. Carefully look over the radio and figure out how to get at the wheel. Some radios' wheels can be removed without disassembling the whole transmitter, but most require you to take out the screws on the back and separate the radio case's halves. Be careful not to force anything apart. Turn the wheel back and forth to see the moving parts. The spring usually sits on two arms that resemble pliers. Use one (or two) orthodontic rubber bands (available at drugstores or from a buddy who has braces on his teeth) as a substitute for the broken spring. You can also try to use a spring from a ballpoint pen, but it will have to be cut to get the proper tension. This fix will get you back on the track until the new spring arrives.

Longer-Lasting Glow Igniter

I have a problem with my glow igniter. It seems to lose its charge very quickly. Can I add another cell to make it last longer? [email]
JOE RANNAZZISI

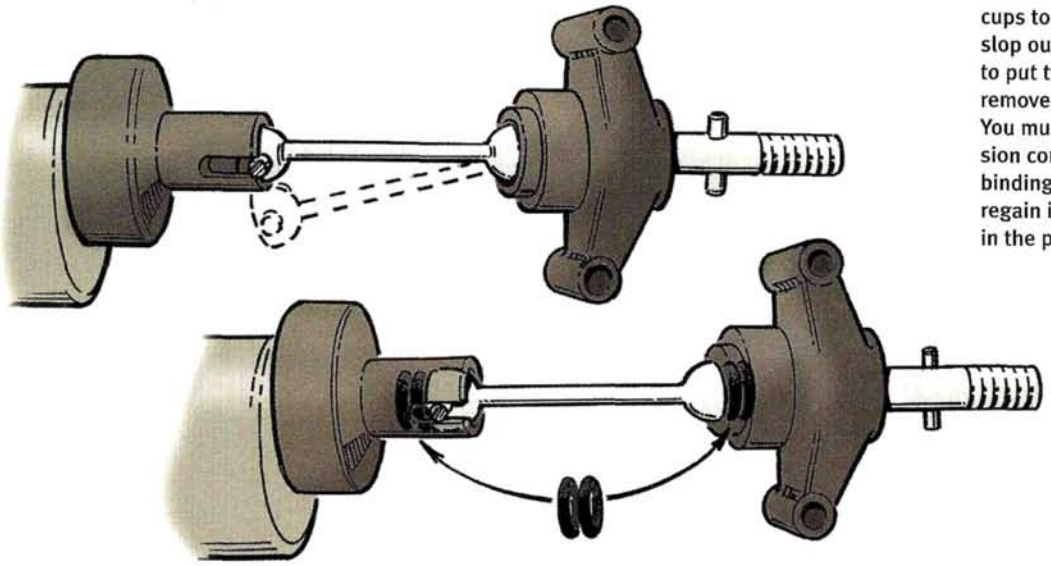


There is a simple way to make a glow igniter that has twice the endurance of a single-cell unit. Solder together 2 cells from an old pack in parallel (positive to positive and negative to negative). This keeps the voltage at 1.2 but doubles the capacity, resulting in twice the run time. Do not assemble the pack in series (positive to negative), as this will give you a 3V pack. Glow plugs are designed to handle 1.5 volts; anything above that will burn out the coil more quickly. Now all you need is a Du-Bro prewired glow igniter; just solder it to the 2-cell pack, and your "Super Igniter" will be complete.

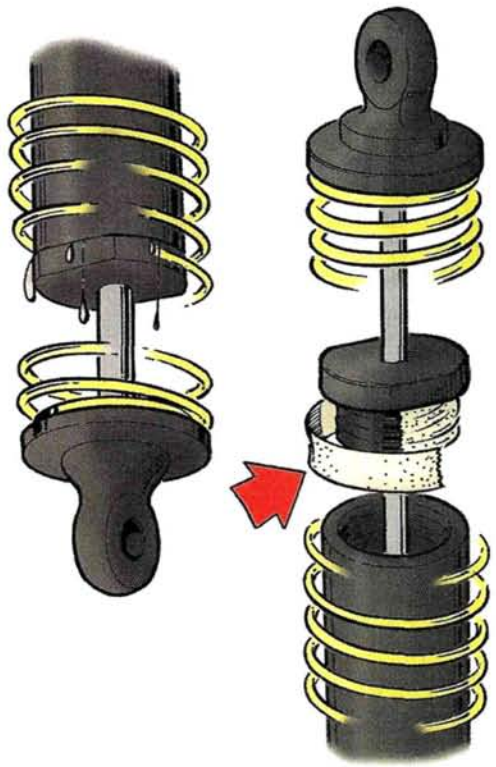
Troubleshooting

Improperly Adjusted Drive Axles

I have been having trouble with my Tamiya King Blackfoot. The transmission drive cups keep coming out when I drive. How can I prevent this from happening?
ALEX SCHLANGEN
Yucaspa, CA



Check your manual; I think you forgot to put the O-rings in the drive cups. Place a rubber O-ring in each of the differential drive cups and the hub drive cups to center the axle and take the slop out of the driveline. You may have to put two O-rings on one side to remove the excess play in the axles. You must be certain that the suspension continues to compress without binding. Your King Blackfoot should regain its title after a few short minutes in the pits.



Leaking Shocks

The shocks on my Losi Double-XT keep leaking oil. I have taken them apart and bled them several times, but it doesn't help. How can I get them to stop leaking? [email]
DAVID DUNN

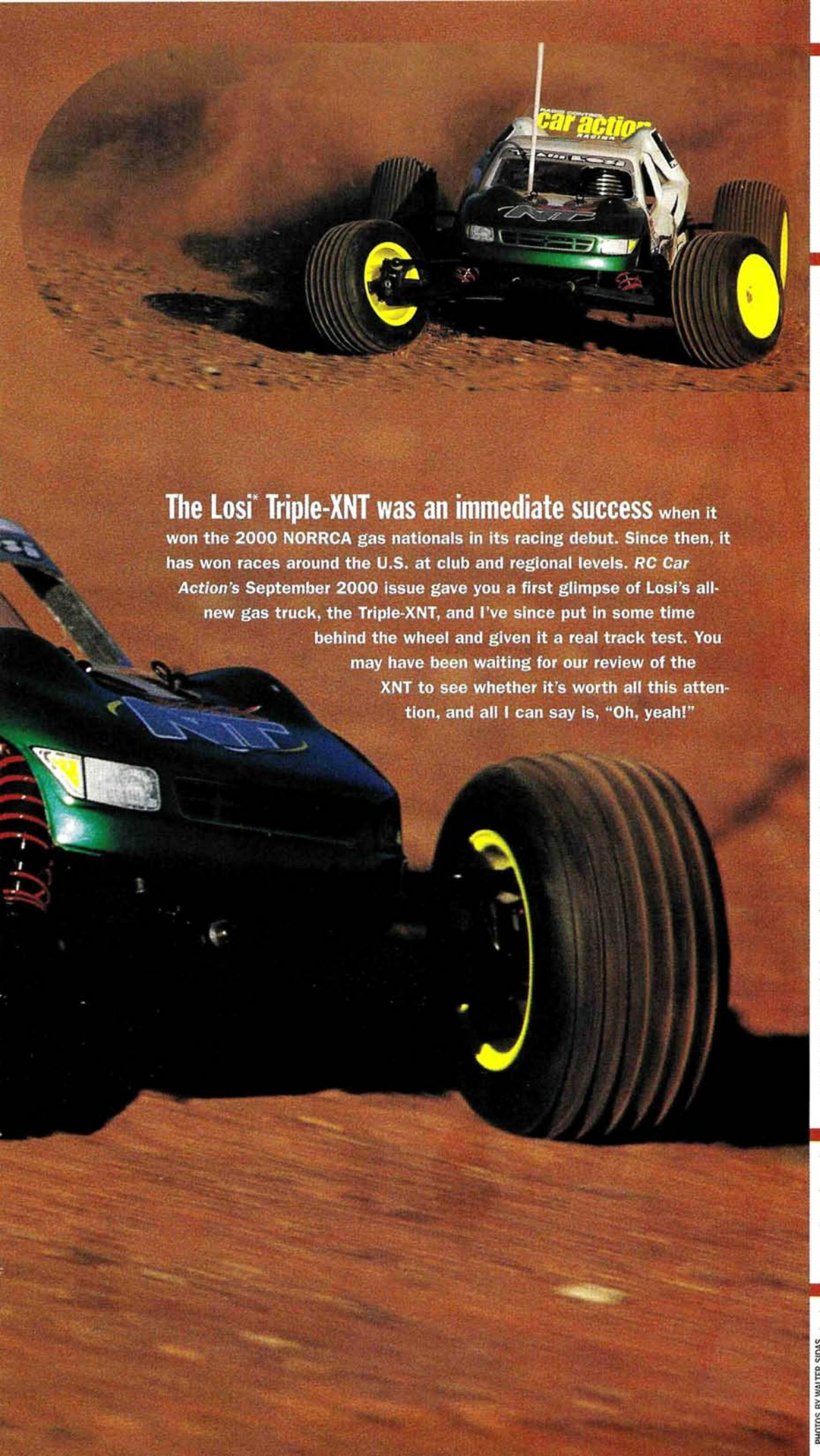
First, replace all the O-rings. Losi offers shock rebuilds that come with the whole cartridge, including O-rings, for a quick rebuild. MIP also offers O-rings for individual replacement; if you decide just to replace the O-rings, carefully disassemble the cartridge and lay out the pieces as you remove them. Check the cartridge for cracks; if there's damage, replace it. Replace the old O-rings with fresh ones, and reassemble the cartridge. This is a good time to check the condition of the shaft; if it has any scratches or nicks, they could tear the O-ring and cause the shock to leak. Fill up the shocks with oil, and tighten the cartridges fully (RPM makes an excellent set of shock tools for Losi shocks that makes the job easy and won't mar the shock cartridge or body). If they still leak, and it looks as though they're leaking from the threads, pick up some Teflon tape at a home improvement store and stretch a length of it around the threads in a clockwise rotation; then reinstall the cartridge. Wrapping the tape clockwise around the threads will prevent the tape from unwinding as you tighten the cartridge. This should completely seal the shocks and prevent any further leaking. ■

TRACK TEST
1/10-SCALE NITRO

Team Losi **Triple-XNT**

Fast laps with Losi's latest nitro racer

by Derek Buono



The Losi* Triple-XNT was an immediate success when it won the 2000 NORRCA gas nationals in its racing debut. Since then, it has won races around the U.S. at club and regional levels. *RC Car Action's* September 2000 issue gave you a first glimpse of Losi's all-new gas truck, the Triple-XNT, and I've since put in some time behind the wheel and given it a real track test. You may have been waiting for our review of the XNT to see whether it's worth all this attention, and all I can say is, "Oh, yeah!"

DATA CENTER

VEHICLE TYPE 1/10-scale nitro-powered racing truck
BEST BUYER Experienced racers who want the best
KIT RATINGS (poor, satisfactory, good, very good, excellent)
Instructions Excellent
Parts fit and finish Excellent
Durability Very good
Overall performance Very good

SPECIFICATIONS

MANUFACTURER Team Losi
MODEL Triple-XNT
DISTRIBUTED BY Horizon Hobby

SCALE 1/10
STREET PRICE $289.99

DIMENSIONS
Wheelbase 11.25 in. (286mm)
Width F/R 12.75 in. (324mm)

WEIGHT
Total, as tested (w/empty tank) 67.2 oz. (1,890g)

CHASSIS
Type 1/8-inch plate with molded upper deck
Material 7075 aluminum

DRIVE TRAIN
Type 3-gear transmission
Primary Clutch bell/spur
Drive shafts (F/R) universal axle
Differentials (F/R) ball
Internal ratio 4.11:1
Final drive ratio 11.645:1
Slipper clutch Dual disc
Bearing type Teflon-sealed

SUSPENSION (F/R)
Type Lower A-arm w/adjustable upper link
Damping Hard-anodized, oil-filled, coil-over aluminum shocks

WHEELS
Type One-piece plastic
Dimension 2.2 in.

TIRES (F/R)
Type Directional-rib/step pin
Compound Red

ENGINE AND ACCESSORIES
Engine (not included)
Manifold Aluminum universal
Pipe Aluminum tuned pipe

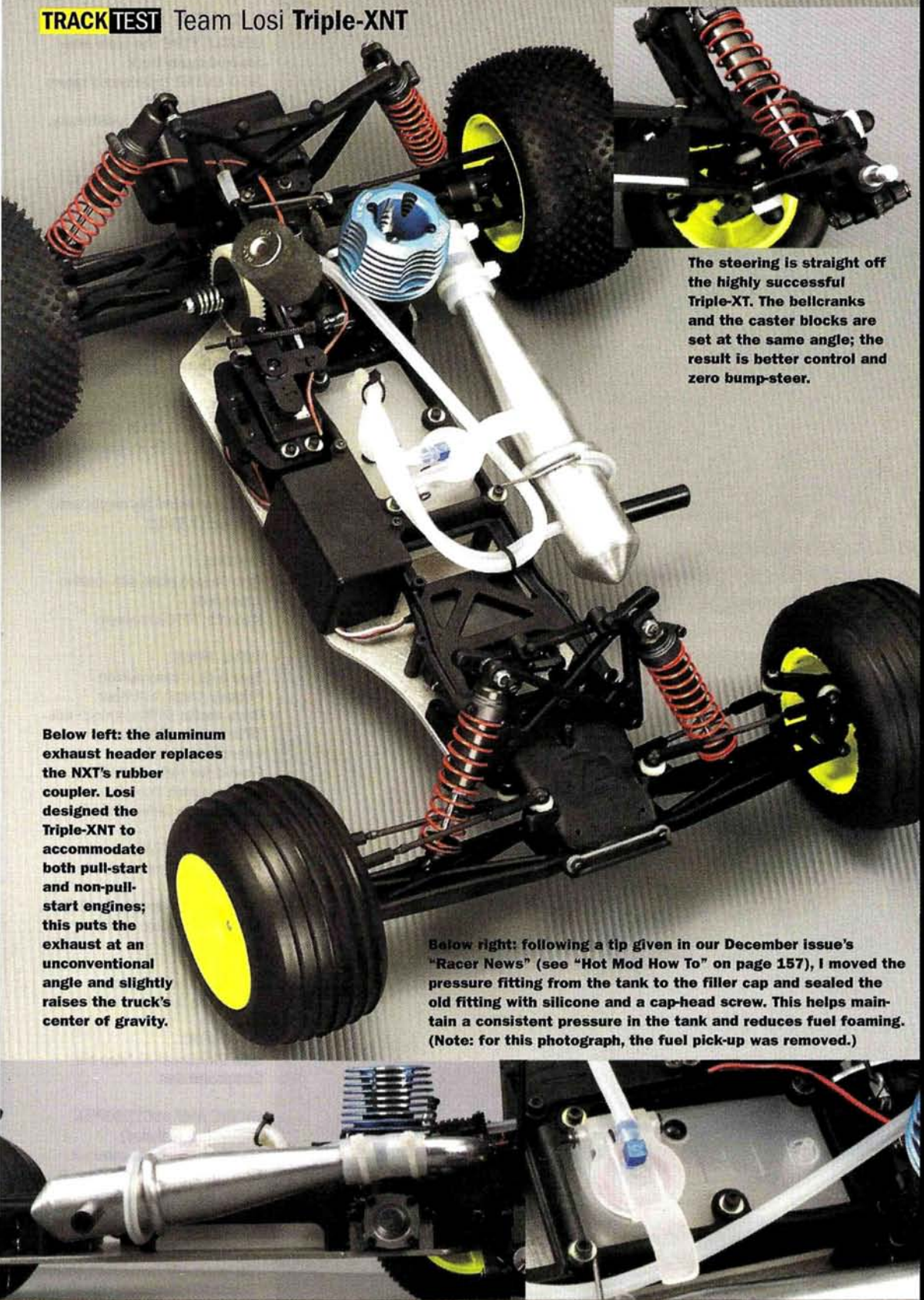
LIKES

- Factory header works with pull-start and bump-start engines.
- Super-stiff aluminum chassis with slotted engine-mounting holes.
- Includes linkages for both rotary and slide carb.

DISLIKES

- Servo access is difficult.
- Ball cups broke easily.

PHOTOS BY WALTER SIDAS



The steering is straight off the highly successful Triple-XT. The bellcranks and the caster blocks are set at the same angle; the result is better control and zero bump-steer.

Below left: the aluminum exhaust header replaces the NXT's rubber coupler. Losi designed the Triple-XNT to accommodate both pull-start and non-pull-start engines; this puts the exhaust at an unconventional angle and slightly raises the truck's center of gravity.

Below right: following a tip given in our December issue's "Racer News" (see "Hot Mod How To" on page 157), I moved the pressure fitting from the tank to the filler cap and sealed the old fitting with silicone and a cap-head screw. This helps maintain a consistent pressure in the tank and reduces fuel foaming. (Note: for this photograph, the fuel pick-up was removed.)

building & setup tips

Matt Francis and his Trinity-powered Losi Triple-XNT have been tearing up the racing circuit, so I thought he would have the best building and setup tips. Here's what Matt suggests:

Shocks. Unscrew the rear shock ends three turns to obtain more travel. Don't worry; there's still plenty of shaft left in the shock end.

Beef up the arm mounts. There's nothing wrong with the stock parts, but I strongly recommend that you use Trinity's much stronger aluminum front and rear pivot blocks for extra security.

Watch the clutch bearings. I check my clutch bearings after every race day because they are subjected to extreme heat. Replace them when necessary.

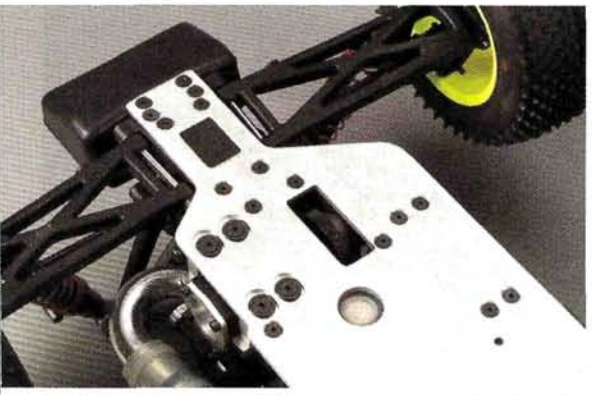
Diff building and adjustment. The instructions suggest that you run six bevel washers in both directions; I use all 12 on the same side. This makes diff adjustment more sensitive but the setting won't drift. I tighten the diff all the way and then back it off 1/12 turn. This is the optimum tension setting.

Slipper tension. I like to run the slipper as tight as possible, and I use it only to prevent the truck from pulling wheelies. It's loose enough to protect the transmission gears and diff against extreme loads, but it's essentially locked under normal race conditions.

Don't forget the thread-lock. During long Mains or when you're just bashing around the yard, the last thing you want is loose screws; when you assemble your truck, use blue Loctite* (the red is too strong and you will never get the screws out). I use it on all the aluminum parts and on the engine-mounting screws.

YOU'LL NEED ■ 2-channel transmitter and receiver ■ Steering servo ■ Throttle servo ■ Receiver pack ■ .12 pull-start or non-pull-start engine ■ Fuel ■ Starter box (only for a bump-start engine) ■ Polycarbonate-compatible paint ■ Thread-locking compound

FACTORY OPTIONS ■ Threaded shock-body sets (0.9/1.2-in.)—part no. A-5055/A-5056 $19.95/set ■ Titanium-nitride shock shafts (F/R)—1.2 in., A5062/1 in., A5064, $7 ■ Graphite suspension arms (F/R)—A-9710/A-9811, $12/$13.95 ■ Graphite kickplate, bulkhead and brace—A-9712, $16 ■ Graphite front shock tower—A-9722, $9.95 ■ Graphite rear shock tower/bulkhead—A-9823, $11.50 ■ Graphite rear pivot block—9823, $6 ■ Graphite center chassis brace—A-9962, $17



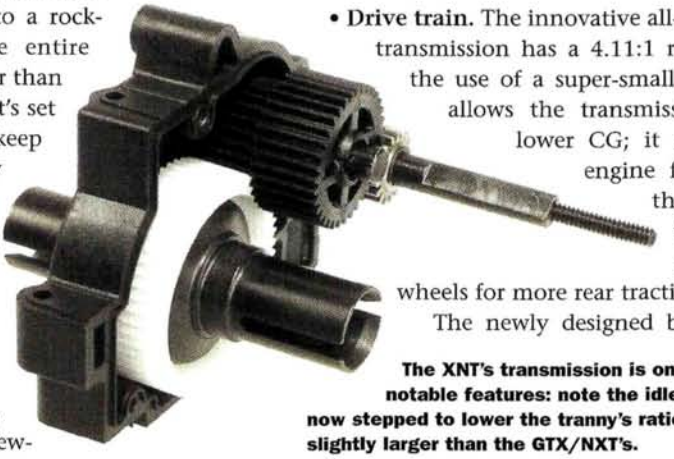
The XNT's chassis is a 7075 aluminum, and the slotted engine-mounting holes offer more gear choices than before. The flywheel access hole is extra large for easier starting.

• **Chassis.** The Triple-XNT uses a super stiff ⅛-inch-thick (3.18mm) 7075 aluminum chassis. This translates into a rock-solid foundation for the entire truck. The chassis is heavier than the previous model's, but it's set very low, and this helps keep the truck's center of gravity (CG) low. Some don't like the chassis' "stone-washed" finish, but I think this "unfinished" look works well, and after a few hours on the track, it won't matter. Every screw is fully countersunk, so there's no chance of screw-head damage. The new, slotted engine-mounting holes allow a more conventional gear-mesh adjustment. The NXT's fixed design meant that for a proper gear-mesh ratio, you had to replace the clutch bell and spur gear at the same time. The result was a limited number of gear-ratio combinations. The XNT allows a greater choice of gear ratios, and you can change the clutch bell and spur gear individually.

The molded upper deck adds rigidity to the already solid aluminum chassis. It surrounds the fuel tank and places it directly in the chassis' center for even weight distribution, regardless of fuel load. The receiver is now in an enclosed case—a great improvement over the NXT's Lexan cover. The battery box, which holds a 4- or 5-cell receiver pack, is a welcome addition, and it eliminates the old zip-tie-it-into-place method of securing the pack (and keeps it out of harm's way).

• **Drive train.** The innovative all-new Triple-XNT transmission has a 4.11:1 ratio that allows the use of a super-small spur gear. This allows the transmission to have a lower CG; it also moves the engine farther back on the chassis, and that puts weight on the rear wheels for more rear traction.

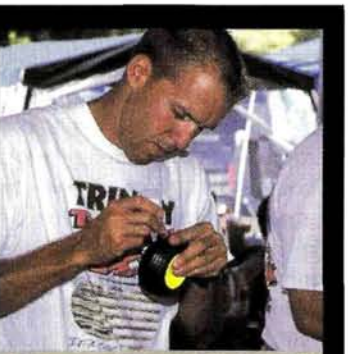
The newly designed ball diff happily



The XNT's transmission is one of its most notable features: note the idler gear, which is now stepped to lower the tranny's ratio. The new diff is slightly larger than the GTX/NXT's.

Matt Francis' standard setup

	FRONT	REAR
Toe-in (inside/outside)	Zero	3°/2°
Ride height	Arms level	Bones level
Camber	-1°	-1/2°
Camber-rod location (hub)	B	A
Camber-rod location (bulkhead)	3 (1 washer under ball stud)	2
Caster	Stock	–
Spindle height	Bottom	–
Rear hub spacing	–	Center
Steering-servo position	Back	–
Swaybar	No	No
Ackerman location	Outside (2 washers on spindle)	
SHOCKS		
Fluid	30WT	40WT
Piston	No. 56	No. 54
Springs	Buggy green	Pink
Limiters	B (inside)	Shock end unscrewed 3 turns
Mounting locations (upper/lower)	No. 2/inside	No. 4/outside



Engine	Picco
Fuel	Trinity Team Blend 20%
Glow plug	Picco
Engine temp.	200 to 220°
Head clearance	1 shim
Muffler	Stock
Manifold	Stock
Spur/clutch bell	19/54

Futaba 3PJS radio
The PCM/FM capabilities of this Futaba* radio mean that it's naturally suited for nitro. Its cleaner signal is less affected by interference, and PCM offers the ultimate in security—fail-safe. And this radio has more features than I know what to do with!

Hitec DCX receiver
Hitec* uses dual-conversion circuitry to weed out those annoying interference signals. Don't forget that this receiver requires a Hitec dual-conversion crystal.

Futaba 9404/9304 steering/throttle servos
There just isn't any substitute for high-quality radio equipment, and the pair of Futaba servos provide high torque and blinding speed. Stock servos will work, but a truck with this level of performance really should have the electronics to match.

Trinity/Picco .12 engine
"Smooth, usable power" describes the Trinity/Picco engine's output. It ran consistently for an entire day of practicing and racing. Available in pull-start and bump-start versions and with a rotary or slide carb, the Picco engine provides excellent power.

GS Racing starter box
The slim, lightweight box from GS Racing* has enough power to start even the most stubborn engine. It's also versatile enough to be configured both for transverse- and standard-mounted engines.

Trinity Monster Horse Power Team Blend fuel
Once it had been broken in, the engine ran smoothly and consistently on 20-percent-nitro fuel. The Team Blend provides a little extra punch, but it's more sensitive to needle adjustments. If you race, this fuel will deliver the power.

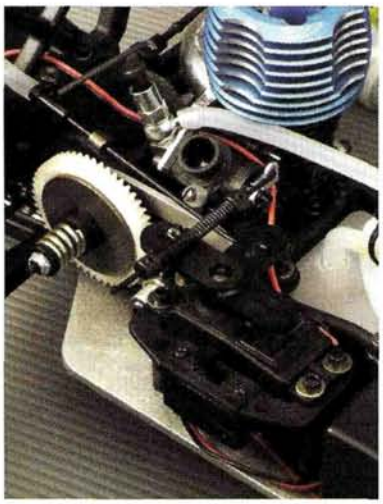
Trinity 1100 NiMH receiver pack
These high-mAh receiver packs from Trinity may be used in a variety of configurations for any vehicle. The 1100mAh will power larger, ⅛-scale cars for 45-minute Mains, so run time isn't a worry.

THE COMPETITION

	Transmission ratio	Bearing type	Drive shaft	Chassis type	Weight (oz.)	Street price*	Reviewed
Associated FT GT	2.60:1	Rubber-sealed	MIP CVD	2.50mm 6061 aluminum	62.72	$299.99	10/00
Kyosho Ultima ST R GP	2.89:1	Metal-shielded	Steel universal	2.50mm 6061 aluminum	67.20	$269.99	03/00
Losi Triple-XNT	**4.11:1**	**Teflon-sealed**	**Steel universal**	**3.18mm 7075 aluminum**	**67.20**	**$289.99**	**02/01**

*Cars are listed alphabetically by brand; *approximate; price varies with dealer.*

accepts the 1hp engines that now dominate nitro truck racing. The tungsten-carbide diff balls and polished-carbon, steel diff rings with hardened outdrives make for one durable differential. Early production kits had out-of-spec diff rings that caused the diff to slip. The problem has been fixed, and the new kits should be fine. Power is directed from the transmission by means of steel universal drives. Teflon-sealed bearings rotate with less friction and are well-sealed against the elements.



Losi had the insight to include linkages that will accept both rotary and slide carburetors. Because the brake setup is on the opposite side of the transmission, a long actuator is used to engage it.

The dual-disc slipper clutch ensures a more consistent slip action. The disc brake has been moved from behind the spur gear to the idler shaft and is now on the opposite side of the transmission. This brings the spur gear closer to the transmission case. The disc itself is supported by a lobed mount that spreads the load over it and more evenly extends its life.

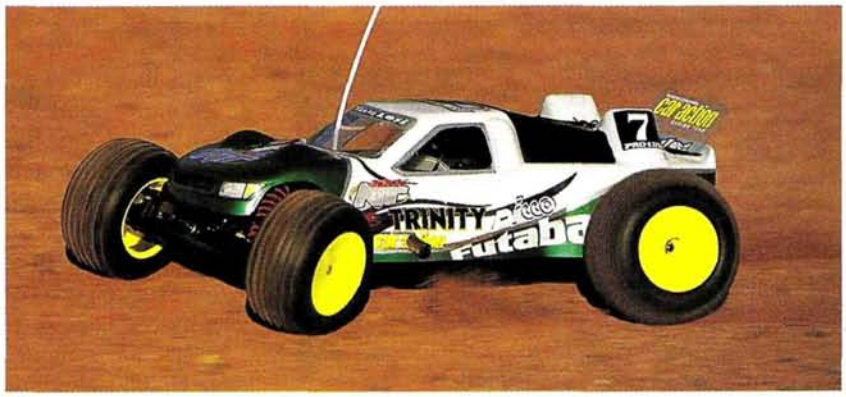
• **Suspension and steering.** The entire suspension geometry is straight from Losi's highly successful Triple-XT electric truck. It's no secret that the XT is one of the best handling trucks on the planet, and the XNT benefits directly from its geometry. The XNT was designed to handle the bumpiest tracks and make it look easy. The XNT's front A-arms and rear H-arms with adjustable, steel turnbuckle upper links allow the XNT to be dialed in to any track. There are ample tuning options up front—six camber locations, and there are five camber locations in the rear. Although this seems to offer fewer choices than previous trucks, average racers won't have to guess about what works and what doesn't. Losi has reduced the number of options to the ones that actually work. The familiar, bottom-loading, hard-body shocks grace all four corners.

The XNT's steering has the same advanced geometry as the Triple-XT. Its angled bellcranks help eliminate bump-steer by putting the bellcrank at the same angle as the steering blocks. A built-in servo-saver protects the servo without being too sloppy and making the steering feel numb. Two Ackerman positions allow you to dial in the steering, and steel turnbuckles connect all the moving parts.

• **Body, wheels and tires.** This new body really gives the XNT a low profile, and its large rear wing helps produce some downforce on the rear wheels. Losi's new flat-face wheels support rear step-pins and front directional-rib tires—all in Losi's red compound rubber.

PERFORMANCE

The March 2001 issue of *RC Nitro* features an awesome nitro-truck shootout, and I was lucky enough to build the Triple-XNT for it. We tested the trucks relentlessly for two days, and I tested the Losi against two other top trucks and some decent drivers—and fellow assistant editor Kevin Hetmanski.



I went to the track with a mile-wide smile because I've been racing the NXT for some time, and I had badly wanted to get my paws on Losi's latest. I broke in the Trinity* Picco engine and took to the track. After setting all the trims and dialing in a tick of drag brake, I went for some laps. I immediately noticed a difference in traction and steering, so after familiarizing myself with the track and the truck, I picked up the pace.

The stock setup worked well. The track was far from smooth, but the XNT easily soaked up the bumps. It entered and exited the corners wherever I wanted it to; in fact, it had a bit too much steering, and when I was too aggressive, it occasionally swapped ends. I actually prefer a loose truck because, as the saying goes, "loose is fast," but this was a little *too* loose. After I had removed the drag brake, the truck was easier to control going into corners. The low transmission ratio made the truck accelerate hard, and the Losi tires seemed to hook up well on the loamy surface.

Getting airborne over the larger jumps, the XNT exhibited awesome handling, and when the nose dipped forward, a blip of the throttle leveled things out. The new brake design also worked well. The fiber brake never seemed to fade, and after setting the final adjustments, I never had to think about them again. The stock setup seemed a little too loose for the bumps, so I made a few changes to get a little more rear traction. Up front, I changed to 35WT oil, and in the rear, I swapped the red springs for a set of softer, pink ones. I then moved the shocks to the second mounting position, and the result was dramatic. The truck exited the corners faster, and I worried less about losing rear traction. The change up front took most of the twitchiness out of the steering, so I was able to turn faster, more consistent laps.

During the two days of tests, the Triple-XNT held up great, but I did break two rear ball cups. It looks as though the rear turnbuckles are a little short—only about six threads actually in the ball cup. When a ball cup broke, it was where the turnbuckle ended. To strengthen them slightly, I suggest a quick 10-minute boil.

Some of the racers with early production kits had diff problems because of the out-of-spec diff rings, but I didn't.

THE VERDICT

The Losi Triple-XNT is definitely one of the best handling gas trucks to hit the track. If anyone doubts that it could be better than previous models, I suggest they take one for a test drive. The XNT has a sweet blend of steering and rear traction, and if you've been waiting for the right time to get into nitro truck racing, the Triple-XNT is definitely ready for you.

To check out our head-to-head shootout, be sure to pick up the March 2001 issue of *RC Nitro*.

**Addresses are listed alphabetically in "Featured Manufacturers" on page 216.* ■

Associated Factory Team RC10T3

The A-team's ultimate electric truck

by Kevin Hetmanski

The "all-the-hop-ups" concept has gained popularity, and many companies now offer "no-modifications-needed" versions of their best racing machines. Team Associated* has followed suit with its Factory Team line that started with the ever popular RC10GT and was soon followed by the world champion B3 buggy. Associated recently added the T3 racing truck to its Factory Team line. The latest T3 kit includes such parts as MIP CVDs, titanium turnbuckles, blue-anodized parts and more. If you're the type who usually adds hop-ups before run number one, then this is the kit for you.

DATA CENTER

VEHICLE TYPE 1/10-scale electric 2WD competition truck

BEST BUYER Experienced racers, and anyone who likes top-of-the-line equipment.

KIT RATINGS (poor, satisfactory, good, very good, excellent)
Instructions Very good
Parts fit and finish Good
Durability Very good
Overall performance Very good

SPECIFICATIONS

MANUFACTURER Associated
MODEL Factory Team RC10T3

SCALE 1/10
LIST PRICE $379.99
STREET PRICE $209.99

DIMENSIONS (chassis only)
Overall length 15.75 in. (400mm)
Wheelbase 11.2 in. (284.48mm)
Width 12.5 in. (317mm)

WEIGHT
Total, as tested 60 oz. (1,712g)

CHASSIS
Type Molded tub
Material Graphite

DRIVE TRAIN
Type Sealed 3-gear
Primary Pinion/spur
Drive axles MIP CVDs
Differentials Ball
Bearing type Rubber-sealed ball bearings

SUSPENSION
Type Lower A-arms w/titanium turnbuckle upper link
Damping Oil-filled, coil-over shocks

WHEELS
Type One-piece white dish

TIRES
Type (F/R) Pro-Line Edge/Pro-Line Bow Tie

LIKES

- All Associated's trick parts are included with the kit.
- Excellent transmission.
- Rubber-sealed bearings are maintenance-free.

DISLIKES

- Some popular steering servos may be a tight fit on the chassis.
- Slight hand-fitting required on steering parts.

PHOTOS BY WALTER SIDAS

Kingpin ball studs are used up front. Blue axles are included in the cool blue package.

building & setup tips

The Factory Team T3 includes Associated's "all purpose" T3 manual, which covers all the varieties of the truck, from "Basic" to "Team." Follow the "Team" steps to build the "Factory Team" version of the T3. Here are some additional tips:

Ream it. When I installed the kingpin ball studs, I had a hard time getting the kingpins through the holes in the steering parts. Run an 1/8-inch ream through the parts for a perfect fit. The ream also comes in handy for tight-fitting hinge-pin bores, but the T3's parts generally don't need the extra attention.

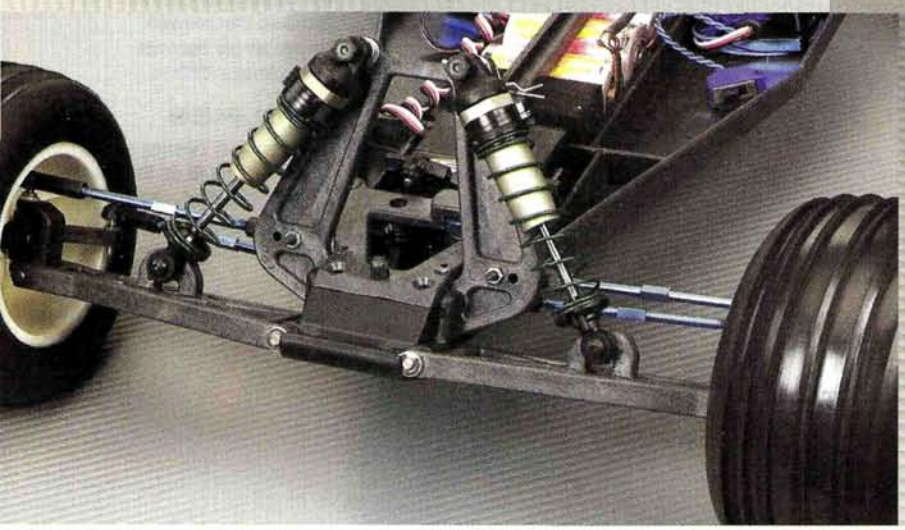
Blue screws. The instruction manual doesn't tell you where to use the included, blue-anodized hardware, so it's totally up to you. Save the screws for parts that won't be under a lot of stress, such as tranny case, gear cover and servo screws.

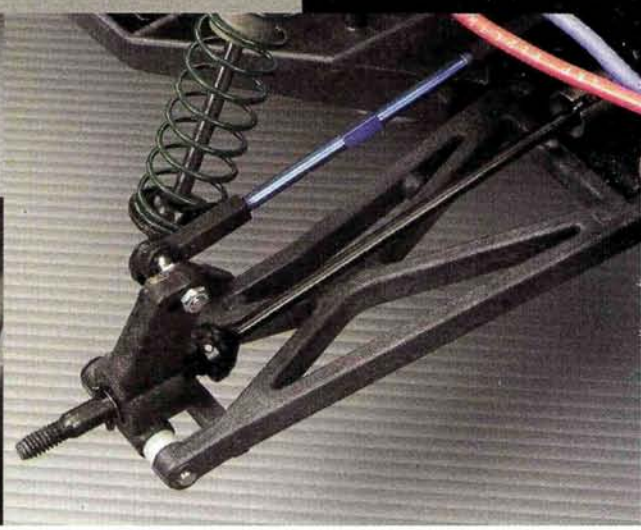
Pump the shocks. There's no such thing as a completely air-free shock, especially with a top-filled, bladder-less design like Associated's Team shocks. Do the best you can to keep air out as you build, and pump the shocks before each heat by cycling the suspension arms up and down. This will emulsify any air trapped in the shock, and the shock stroke will be buttery smooth.

YOU'LL NEED

- ESC
- Battery
- Radio
- Motor
- Charger
- CA glue
- Polycarbonate-compatible paint

Below left: the front shock tower is molded graphite, which is strong and light. Wear-resistant Unobtanium shock shafts are a bonus. Below right: adjustable blue titanium turnbuckles make it easy to fine-tune the suspension. MIP CVDs drive the wheels; they spin in rubber-shielded bearings.





KIT FEATURES

• **Chassis.** The Factory Team T3's chassis is identical to the standard T3's in its configuration, but it's molded of graphite composite instead of Associated's usual plastic formula. Stiffening ribs and the battery tray's side rails lend additional stiffness. The chassis' angled-up sides increase cornering clearance and reduce its "footprint," if it bottoms out on the track. Both the battery and the steering servo are in the chassis' center, and because they sit low, the truck's center of gravity is as low as it can be. The battery has extra space in front and behind it so that it can be moved forward or backward to increase steering or rear traction. A graphite battery strap holds the battery in place. The kit comes with blue-anodized aluminum nose and tail plates that are otherwise the same as the black parts included with the standard T3.

• **Drive train.** The time-tested Stealth transmission is featured here, and its design is identical to that of the RC10B3 and the other T3 versions. The tranny has a 2.4:1 ratio, which Associated chose as the ideal for both buggies and trucks. The top gear is fixed to the input shaft, which is home to Associated's large-diameter, single-disc slipper clutch. The assembly is behind the spur gear, and the gear can be removed without altering the slipper's setting. The Stealth tranny is well-known for its smooth differential, and its reputation is well-deserved: the diff action is perfect. For the Factory Team touch, the motor plate is blue-anodized, and MIP CVDs replace the standard T3's steel drive shafts.

• **Suspension and steering.** The truck's suspension consists of graphite lower A-arms with blue titanium turnbuckles. Damping is handled by Team shocks that have hard-anodized aluminum bodies, plastic caps, Teflon pistons and Unobtanium shock shafts (Unobtanium is a wear-resistant, hard coating). Coated shock shafts are usually optional, but Associated includes them with the Factory Team kit. Spring preload can be adjusted with plastic clips (various sizes), and the shocks are mounted on molded graphite shock towers. The Factory Team's steering system uses the same molded bellcrank with a built-in adjustable servo-saver as the other B3 and T3 models, but this kit includes sealed bearings and titanium tie rods. The short steel link joins the steering servo to the bellcranks.

• **Body, wheels and tires.** A Pro-Line Silverado body tops off the Factory Team T3; mine was custom-painted by Motion Graphics*. Pro-Line also supplies the rubber: front Edge tires and rear Bow Ties. White dish rims help distinguish the Factory Team T3 from the regular T3, which has neon yellow wheels.

PERFORMANCE

I headed to Xtreme RC in New Milford, CT, for a day of racing with the Factory Team T3. I had a hard time getting the truck's stock tires to hook up to the track's surface; the Bow Ties didn't seem to work well on the track's fluffy dirt. When I switched to Pro-Line's Step-Pins, the truck was a little more dialed. It's immediately obvious on the track that the Factory Team T3 has an abundance of steering, both on and off power. It was very stable over the bumps, and I was able to burn right through the whoop section. The truck's smooth transmission and differential really put the power to the ground. I still lacked forward traction after changing tires, so I moved the battery back toward the truck's rear. This took a little away from the steering, but the truck already had so much of it that my lap times weren't really affected. Most of the day, I ran with the stock setup, and it felt good; after I've spent more time racing the T3, I'm sure I will get it to perform even better.

THE VERDICT

It's no surprise that an already successful truck is that much more desirable in a hopped-up version, but you'll be disappointed if you expect the Factory Team T3 to sail past the regular T3s at the track. The Factory Team's upgrades are more about style (blue-anodized nose, tail and motor plates, Silverado body) and longevity (Unobtanium shock shafts, titanium camber links, sealed bearings) than about increased performance in terms of outright speed or enhanced capability. Not that there aren't any performance-enhancing parts in the Factory Team package: the graphite components trim off some weight and increase the rigidity of the suspension system, and the MIP CVDs are the best drive shafts in racing. But these parts won't win a race for you, and that's less a criticism of the truck and more a compliment to the T3 platform, regardless of version. The T3 is ready to race no matter which version you buy, but the Factory Team T3 is a little stronger and a little prettier, and it's a better value than it would be if you added the parts separately. I think that's exactly what Associated intended the Factory Team T3 to be.

**Addresses are listed alphabetically in "Featured Manufacturers" on page 216.* ■

Airtronics M8 radio
Because the Factory Team T3 is a full-blown race machine, it's only natural to use this Airtronics* radio. Servo-reversing, throttle and steering-speed adjustments are just a few of the many features that make this radio perfect for my T3.

Futaba S9450 digital servo
Futaba's* popular digital servo has a claimed torque output of 76.4 oz.-in. with a transit speed of 0.11 second at 4.8 volts. This servo shows its muscle on the track; it had no trouble pointing those big truck tires in the right direction.

Reedy Fury 12x2 motor
This modified is at the top of the Reedy* motor lineup. It features a special vented can to reduce its operating temperature. The capacitors come soldered on the tabs, and this allows it to be dropped into any vehicle, right out of the box.

Reedy Zappers 2000mAh matched pack
When it comes to racing, matched batteries are the way to go. Reedy Zapper batteries have the punch and long run times I look for. They feature voltage-maximizing technology and are perfect for off-road racing.

LRP V7.1 ESC
The V7.1 ESC is the latest from LRP*. An adjustable brake pot on the ESC's face allows you to fine-tune your brakes for different track conditions, and plug-in "chips" are used to set the current limiter. You can also change the power program by changing the chip's orientation to one of four positions.

THE COMPETITION

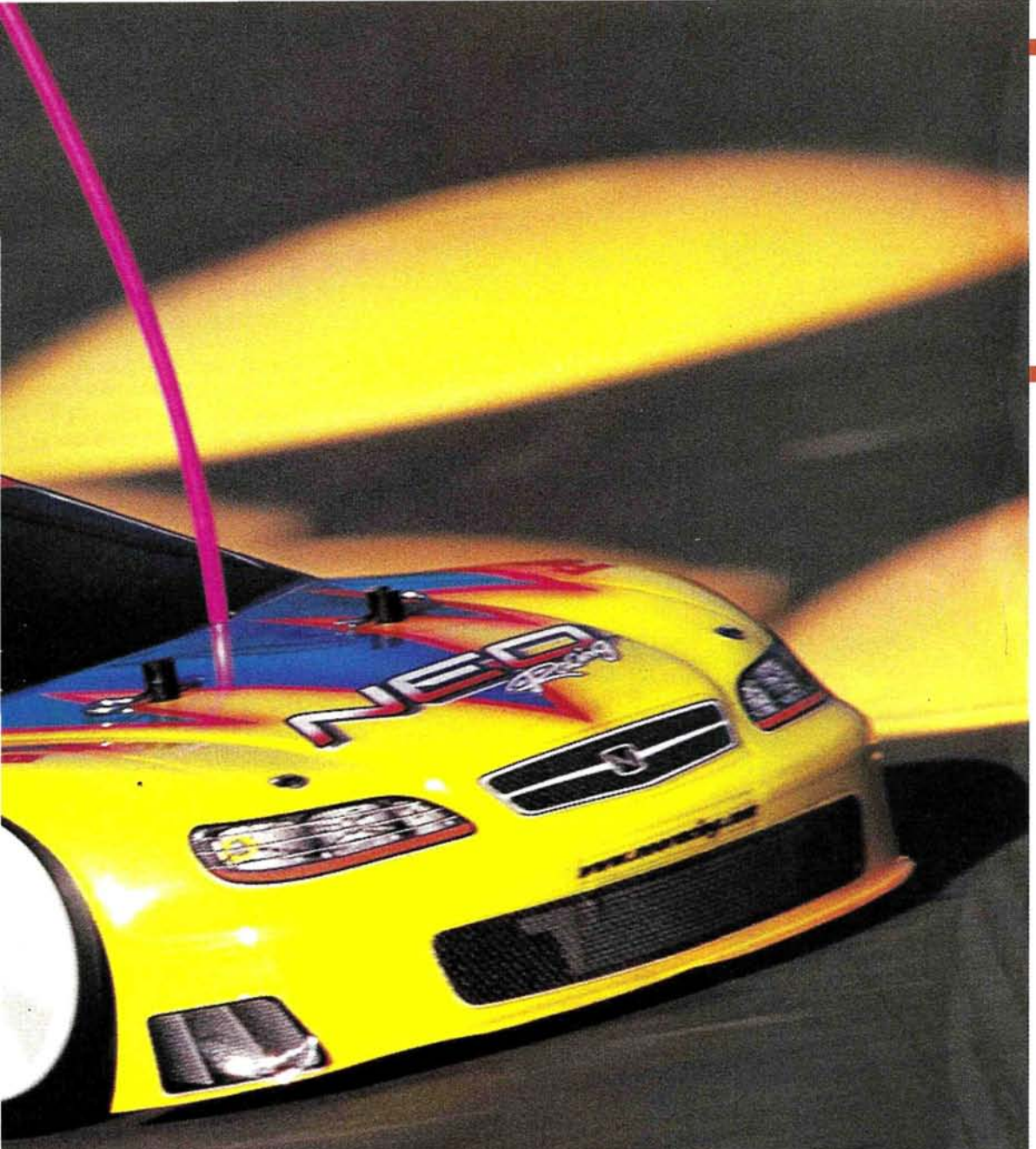
	Bearing type	Drive shaft	Tires	Shocks	Weight	Wheelbase	Street price*	Reviewed
Associated RC10 T3	**Rubber-sealed**	**MIP CVDs**	**Pro-Line**	**Top-filled, hard-anodized**	**60 oz.**	**11.5 in.**	**$209.99**	**02/01**
Kyosho Ultima	Shielded	Universals	Pro-Line	Top- & bottom-filled, anodized	64.8 oz.	11.6 in.	$229.99	06/00
Losi Triple-XT	Fiber-sealed	Universals	Losi	Bottom-filled, hard-anodized	64 oz.	11.4 in.	$209.99	05/00

**Price varies with location.*

Neo **T-21 M**

Neo makes an electric touring bid with a mid-motor machine

by Robert Allgeyer



Since Yokomo's first two-belt touring car was released on the heels of the Tamiya TA-02 chassis that started it all, electric touring car drive-train design has been dominated by belt cars with the motor just ahead of the rear axle and the batteries just ahead of the motor. This layout has more than proven itself, but it certainly isn't the only way to put together a belt car. Lately, mid-motor cars have become more popular; since the OVA Cocoon appeared a few years ago in Japan with the motor-ahead-of-the-batteries layout, we've seen the Team Losi Street Weapon, OFNA OB-4, Schumacher Axis and Club Enthuse adopt similar designs. Neo* is the latest to release a mid-motor machine—the NEO T21 Type M. If you caught the nine-car "Nitro Touring Car Shootout" in the 2000 edition of *RC Touring Cars*, you'll recall that the Neo entry held its own very well; from the looks of it, Neo's electric tourer should also be a formidable competitor. I aim to find out if it really is.

PHOTOS BY WALTER SIDAS

DATA CENTER

VEHICLE TYPE 1/10-scale electric 4WD touring car

BEST BUYER Racers or enthusiasts into high-quality touring cars

KIT RATINGS (poor, satisfactory, good, very good)
Instructions Satisfactory
Parts fit/finish Good
Durability Good
Overall performance Very good

SPECIFICATIONS

MANUFACTURER Neo
MODEL T-21 M
DISTRIBUTED BY America's Hobbies

SCALE 1/10
ESTIMATED STREET PRICE $209

DIMENSIONS
Wheelbase 10.16 in. (258mm)
Width 7.48 in. (190mm)

WEIGHT
Total, as tested 49.28 oz (1,400g)

CHASSIS
Type Double-deck
Material Graphite

DRIVE TRAIN
Type Dual belt
Primary (F/R) Pinion/spur
Drive shafts (F/R) Universals/dog-bones
Differentials Ball
Bearing type Shielded ball

SUSPENSION
Type Lower A-arm with adjustable upper link
Damping (F/R) Oil-filled coil-over shocks

WHEELS
Type One-piece dish

TIRES
Type Non-belted slicks

LIKES

- Externally adjustable differentials are light and operate smoothly.
- Plastic battery hold-downs eliminate the need for strapping tape.
- Includes a good-looking body and decals.

DISLIKES

- Instructions need improvement.
- Servo-saver hits front belt.

building & setup tips

The instructions could use some work. They aren't very clear in some areas, but I was able to assemble the car without too much trouble. I ran into a few small problems; here are a few tips that will help you with your building.

Chassis prep. File a slight chamfer in the chassis's battery slots before you assemble the car; this will prevent the chassis from cutting the shrink-wrap on the battery. After that, apply a little CA to the filed areas to prevent the carbon fiber from splitting.

Steering servo. Be careful when you install the steering servo. If it is not installed at the proper height, it will hit the front belt when the wheels turn left. You can raise the servo by doubling up on the servo tape that holds it in place.

Wiring. When you solder the motor wires to the motor, remove the motor screws and pull the motor out slightly so that you will have better access to its solder tabs.

Front camber links. The car's front upper camber links are at an extreme angle. This doesn't affect handling, but the outside of the link rubs against the hub carrier. Place a few washers under the ball cup attached to the shock tower to space them out. This will decrease the links' angle.

Shock oil. The kit shock oil was a little thin, so I opted for Schumacher* 80WT silicone shock oil.

It's not unusual to find aluminum plates supporting the motor and layshaft on a touring car, but the T-21's parts have a much longer reach to the motor. This makes the rear of the chassis very rigid.

YOU'LL NEED

■ 2-channel transmitter and receiver ■ Steering servo ■ ESC ■ Motor ■ 6-cell stick or saddle pack ■ Polycarbonate-compatible paint ■ Charger ■ Tire glue

FACTORY OPTIONS

■ Shock spring hold-down nuts—part no. NT-300 ■ Ride-height gauge—NT-180 ■ Swaybars (F/R)—NT-150/NT-200 ■ High-performance dampers (F/R)—NT-1000/NT-1100 ■ Clear shocks (short/long)—NT-450/NT-500

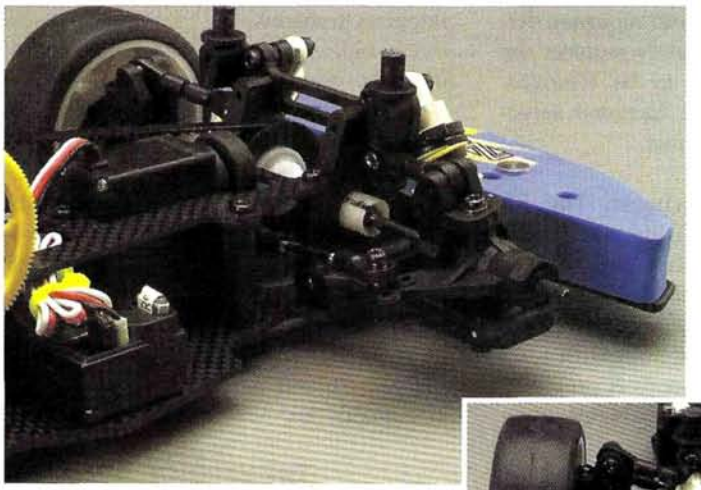
KIT FEATURES

• **Chassis.** Like most "pro" touring cars, the Neo's main chassis is constructed of carbon-fiber plate and is slotted for saddle packs. A short upper deck is also constructed of carbon fiber, but it only supports the chassis's front half; in the rear, the aluminum plates that hold the layshaft and serve as a motor plate also act as chassis stiffeners. The aluminum plates extend from the rear suspension arms to the middle of the chassis and lend considerable strength to the assembly. Molded-plastic battery hold-downs let you scratch strapping tape off your toolbox checklist, and stick packs as well as saddle packs may be fitted. In keeping with the T-21 M's racing mission, I went for saddle packs.

• **Drive train.** The T-21 drive train's most noticeable features (other than its mid-motor layout) are its wide ball differentials with Delrin outdrives. The lightweight plastic outdrives can only help acceleration, and an access hole in each diff's long outdrive makes it easy to adjust the diffs without disassembling anything. All the drive-train parts spin on ball bearings, including the roller-type rear belt tensioner, which also raises the belt for battery clearance. Belt tension can also be changed by repositioning the layshaft, which is held by eccentric bearing mounts. Three positions can be selected to simultaneously loosen one belt while tightening the other. Universal-joint front drive axles and rear dogbones get the power out to the rear wheels.

• **Suspension/steering.** The Neo breaks no new ground in this department and sticks with a lower A-arm/adjustable upper-link system. The hub carriers and arms are connected with hinge pins secured by setscrews instead of E-clips, and the front carriers have a Yokomo-like cowl that shields the universal joints. The front and rear arms reach past the carriers and are capped for extra flex resistance, and they include down-travel screws. The options for camber-link placement include two holes in each of the front hub carriers and the shock tower, while the rear suspension has five hub options and two tower positions. The rear arm mounts provide 2 degrees of toe-in.

Carbon-fiber shock towers outfit both ends, and threaded, aluminum-body shocks damp the suspension but paradoxically use clip-on preload spacers instead of the expected threaded collars. One- and two-hole "fixed" pistons are provided, or you may install the included externally adjustable pistons. The adjustable pistons are made of four pieces: two cogged pistons with an O-ring sandwiched between are mounted on the shock shaft. The pistons are installed so that the small "teeth" on each piston are in line with each other. When the lower piston is turned, the openings between the teeth close, and this changes the damping rate. The fourth piece in the system is a ring that is installed in the top of the shock body. The ring's bottom has teeth that are the same size as the cogs on the piston. To change the shock's damping, the shock shaft is pushed into the shock so that the top piston and ring contact each other; then, a slight twist of the shock shaft turns the lower piston while holding the top one still. The externally adjustable pistons do work, but there is no way of telling how much the piston has been adjusted. I went the easy route



Above: the steering hub has three mounting holes for the steering rod. Note the Delrin diff emerging from the front bulkhead. Right: a large foam bumper is included with the Type M, and it does a good job of protecting the suspension. The front belt rides very close to the steering servo, so watch out for rubbing.

Futaba 3PJS

Futaba's* flagship radio is loaded with features. As nice as the expo settings, model memory, digital trims and other features are, its ergonomics make the 3PJS my favorite. The traditional wheel placement and thick grip are perfect, in my opinion.

Novak Atom

The Atom is an obvious choice for a space-challenged chassis, but there's more to Novak's* smallest ESC than size (or lack thereof). The Atom is basically a baby Cyclone, and like the Cyclone, it can be fully programmed via the Novak Pit Wizard, or you can simply choose one of the three factory-loaded programs ("profiles," in Novak-speak) to suit your needs.

KO Propo PDS-2143 FET servo

This KO Propo* servo has more than enough speed and power for electric touring with its 0.08-second transit time and claimed output of 111 oz.-in of torque. On the convenience side, the 2143 does not require a separate FET lead.

Orion Orbital Pro-BB 12-turn triple motor

Orion's* machine-wound mods turned in good numbers in our mod motor shootout (August 2000), so I tried a bearing-equipped Pro BB model. Performance is the most important thing, but there are some technical bonuses that help out on the bench. Most notable are the surface-mounted capacitors built into the endbell, and the color-coded brush heat sinks that help you avoid the dreaded reverse-motor hookup.

Orion V-Max 2400 batteries

The latest Sanyo 2400 cells reportedly have more punch and better run time than the first batches, and Orion's V-Max voltage-increasing process can only help the cells pump out more power. I like the punch of Ni-Cds, and the milder motors I prefer (12-turn is mild, these days) simply don't need the extra juice.

THE COMPETITION*

	Drive shafts (F/R)	Diff outdrives	Chassis	One-way system	Weight	Wheelbase	Street price**	Reviewed
Alex Racing CE 4	Universals	Delrin	Carbon fiber	Front	53 oz.	10.07 in.	$450	1/01
NEO T-21 Type M	**Universal/dogbone**	**Delrin**	**Carbon fiber**	**None**	**49.28 oz.**	**10.16 in.**	**$209.99**	**2/01**
OFNA OB-4 Pro	Universals/dogbones	Delrin	Carbon fiber	None	47.5 oz.	10 in.	$209.99	5/00
Schumacher Axis	Plastic universals (F/R)	Aluminum	Carbon composite	None	51.36 oz.	10.13 in.	$229.99	6/00

**Cars are listed alphabetically by brand; category is too large to list all competitive cars. All listed cars feature mid-motor chassis layouts, oil-filled shocks and full bearing sets. **Approximate; price varies with dealer.*

T21 NR-4

The NR-4 is the sister car to the Type M, and it features a rear motor layout. The cars are otherwise identical and share all their molded front and rear suspension parts, shock towers, shocks and differentials. This raises the question, "How does their weight distribution differ?" According to our scales, the 1,343g T-21M places 614 grams over the front wheels and 729 over the rears, for a 46:54 percent split. The NR-4 weighs in at 1,343 grams, and with 644 grams on the nose and 699 in the tail, it distributes its weight 48:52 percent. The NR-4 is a little more tail-heavy, to the tune of about 1 full ounce. On the track, the NR-4 pushed slightly more than the T-21, but otherwise, it handled just as well.

and went with the "fixed" pistons.

The steering servo is connected directly to the steering arms and mounted vertically, which unfortunately requires the servo's mounting tabs to be removed. Threaded rods link the included servo-saver and the steering arms.

• **Body, tires and wheels.** The kit includes one-piece, dish-style wheels with decorative slots that give them a reel-to-reel tape-recorder look. Unbelted slick tires with foam inserts are included, and a Neo Honda Accord body with a full set of detail and logo decals is provided. The car shown here was painted by Motion Graphics*.

PERFORMANCE

All my previous sedans have been "regular" rear-motor designs, so I didn't know what to expect of the mid-motor Neo. I placed the car on the track and made a few slow laps to get my radio dialed in. Once I was used to the track layout and had my radio tuned, I let it all hang out. I was impressed with the acceleration off the line, and the relatively firm kit tires hooked up better than I expected. After a few hard laps, I heard the front belt skipping, so I moved the layshaft back one position to tighten it (and I readjusted the rear tensioner for the corresponding looseness in the rear belt). Then I put the car back on the track and had no more skipping problems.

On tight turns, the T-21 occasionally lifted its inside wheels enough to unload the diffs and torch or spin the tires and add tenths to my laps. Heavier shock fluid could help, but stiffer springs would be the best fix. As long as I didn't push the T-21 to those limits, I found it to be a mostly neutral handler that pushed slightly at speed, probably owing more to the kit tires than to any incurable chassis deficiencies. With sticky racing rubber, the Neo should perform as well as any race-quality kit.

THE VERDICT

I had a lot of fun testing the T21 Type M. With all the adjustments that the car offers and with a little more track time, I'm sure I will be able to get it dialed on just about any track. The name "Neo" might not be too familiar to all you racers out there, but I'm sure that it will become a part of your vocabulary, once the cars start appearing on tracks. America's Hobbies will distribute the cars in the U.S. and should have Neo T-21 Ms (and NR-4s; see the sidebar above) available in time for the summer season.

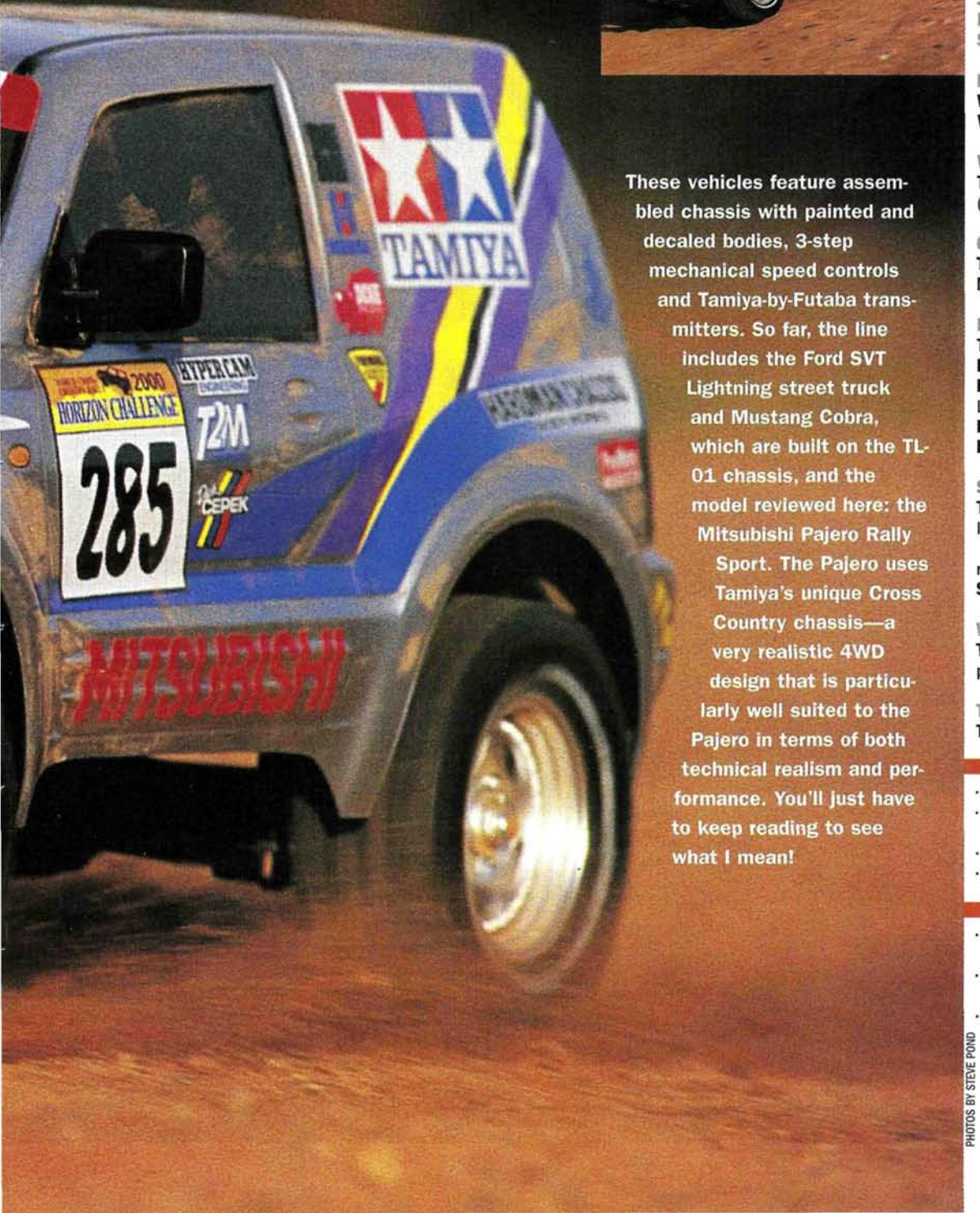
**Addresses are listed alphabetically in "Featured Manufacturers" on page 216.* ■

Tamiya XB Pajero Rally Sport

Ready-to-run gets real

by Peter Vieira

Tamiya® is no stranger to the ready-to-run RC market, but it has never offered RTR versions of its "hobby" kits. Instead, Tamiya's "QD," or Quick Drive, line was built on zero-maintenance, mini-size versions of popular vehicles such as the Blackfoot and Midnight Pumpkin as well as real car favorites such as the Ferrari Testarossa. Now, with the burgeoning success of RTR vehicles based on what were traditionally "kit" offerings, Tamiya has decided to take the plunge with its Expert Built line ("XB" for short).



These vehicles feature assembled chassis with painted and decaled bodies, 3-step mechanical speed controls and Tamiya-by-Futaba transmitters. So far, the line includes the Ford SVT Lightning street truck and Mustang Cobra, which are built on the TL-01 chassis, and the model reviewed here: the Mitsubishi Pajero Rally Sport. The Pajero uses Tamiya's unique Cross Country chassis—a very realistic 4WD design that is particularly well suited to the Pajero in terms of both technical realism and performance. You'll just have to keep reading to see what I mean!

PHOTOS BY STEVE POND

DATA CENTER

VEHICLE TYPE 1/10-scale, ready-to-run, electric 4WD truck
BEST BUYER First-time hobbyists, scale-detail fans, truck enthusiasts, anyone interested in fun-first RC

KIT RATINGS (poor, satisfactory, good, very good, excellent)
Instructions Good
Parts fit/finish Excellent
Durability Very good
Overall performance Satisfactory compared with other RTRs; very good for scale-like, authentic performance

SPECIFICATIONS

MANUFACTURER Tamiya
MODEL XB Mitsubishi Pajero Rally Sport

SCALE 1/10
LIST PRICE $325
STREET PRICE $190

DIMENSIONS
Wheelbase 9.625 in. (244.47mm)
Width 7.68 in. (195.25mm)

WEIGHT
Total, as tested 65.31 oz. (1,850.94g)

CHASSIS
Type Molded tub w/integral gearbox
Material Plastic

DRIVE TRAIN
Type Enclosed gear transmission
Primary Pinion/spur gear
Drive shafts (F/R) Dogbone/straight axle
Differentials Gear
Bearing type Plastic bushings

SUSPENSION
Type—front Lower H-arm w/fixed-length upper camber link
—rear Trailing arm with straight rear axle
Shocks Friction-type coil-overs

WHEELS
Type One-piece 5-spoke plated plastic

TIRES
Type Treaded all-terrain

LIKES

- Realistic, rugged drive train.
- Excellent factory assembly and finishing.
- Beautiful wheels and tires.
- High-quality radio gear.

DISLIKES

- Body mounts cannot be adjusted to fit other bodies.
- Undamped shocks bottom out harshly.
- Manual does not cover complete assembly.

Look at the size of those gears! The transmission looks more complex than it is; with the exception of the pinion/spur mesh, there are only three meshing gear surfaces.

building & setup tips

The Pajero is truly ready to run as soon as you install a charged stick pack and transmitter batteries, so just juice it up and have fun. The only thing I wished for was a "ground up" manual that covered the kit's assembly, or at least its maintenance needs. Although its inner workings are simple to understand, and the manual's exploded parts diagram is helpful, rank beginners would benefit from step-by-step instructions when it's time to tear down the truck to add hop-ups or make repairs. The following tips will help you choose a battery and charger if you don't already have them, and I include notes on hop-ups and maintenance, too.

Get a peak charger. In our December issue, we just ran a complete guide to the available models, and they all work well. You'll find the Dynamite* Mega Peak and Vision peak, DuraTrax* Piranha and MRC* Super Brain in most hobby shops, and they're all good choices.

Stick with Ni-Cd batteries. The new nickel-metal-hydride cells are great for racers, but they cannot be charged properly by inexpensive chargers (and many expensive chargers, for that matter). You don't have to buy an expensive pack; even a 1500mAh battery will give good run times with the Pajero. If you can swing for a 2000 or 2400 pack, go for it; you'll run even longer on one charge.

Best upgrades. Bearings and fluid-damped shocks are the biggies here. You can use Tamiya's plastic touring car shocks or its excellent Low Friction hop-up models. You could even upgrade the kit shocks with the required shafts, pistons and bladders if you know some Tamiya buffs with spare parts. There are a few sources of bearings; Tamiya's set is rubber sealed and of very high quality; less expensive options are available from DuraTrax, Bruckner Hobbies* and others. Boca Bearing* also offers a variety of bearings—everything from aerospace quality to budget types.

Maintenance. The Pajero doesn't ask for much time on the workbench, and as long as you keep it relatively clean, you'll spend much more time driving than wrenching. All you need to do is check the screws and axle nuts for tightness after every few runs, and keep the mechanical speed control clean and lubricated with the included grease. For extra security, I applied thread-locking compound to the long screws that secure the rear axle to the trailing arms and to the setscrews that secure the drive shaft.

YOU'LL NEED ■ 6-cell stick pack ■ Charger ■ Eight AA batteries

FACTORY OPTIONS ■ Sealed ball bearings (4)—part nos. 53008 (11x5mm), 53030 (8x5mm), 53065 (12x6mm) ■ Low-Ride Conversion kit—53187 ■ 4WD torque splitter—53188 ■ High-torque servo-saver—50473 ■ 20-/21-tooth AV pinion-gear set (note: only 20T may be used with Pajero)—50356

KIT FEATURES

We rarely show kit boxes, but Tamiya's elaborate window-box presentation deserves a look. How psyched would you be to pull the wrapping paper off this box?

• **Chassis.** No other RC kit is built like the Pajero; its Cross Country design uses a deep, scale-like tub with functional wheel wells. Faux frame rails are molded into the outside of the tub, and the underside of the chassis is fitted with skidplates and molded details that lend realism to what is traditionally an overlooked area of an RC car. Inside the tub are molded recesses for the motor and front gear train; in a sense, the chassis is the gearbox, since the gears and motor simply drop into the chassis. Hatches are installed over the gears to seal the drive train, and a built-in battery tray holds a stick pack (not included) across the chassis.

Above: here's a peek inside the rear differential; countless Tamiya diffs have used these rugged gears. Right: This is what you'll find inside the rear axle housing—looks tough, doesn't it? The metal ring and pinion gears should last forever, but the plastic bushings will have to be replaced at some point. There's a metal bushing on the nose of the bevel pinion gear.

• **Drive train.** The Pajero's 4WD system is particularly authentic. The included 540 motor is installed directly on the chassis (instead of attached to an independent gearbox), and the output shaft is in line with the chassis' centerline. The motor's pinion gear engages a spur gear that transfers power to the front differential (a typical Tamiya 3-gear type) via a bevel gear and a countergear. The pinion/spur gear mesh is fixed, and the motor mount allows a 16-tooth (included) or 20-tooth pinion to be fitted.

With the exception of the in-line motor, that's fairly standard stuff; it gets more interesting as we follow the drive train to the rear wheels. The spur gear that spins the front diff also spins a countergear under the chassis. A massive drive shaft is connected to this gear by means of a large universal joint, and an identical joint connects the drive shaft to the straight rear axle (well, the universal joints are almost identical; the front unit includes a telescoping sleeve to prevent the drive train from binding as the suspension operates). A bevel gear in the rear axle housing drives the rear diff, which uses the same 3-gear mechanism as the front diff, but instead of an all-plastic case, the rear diff is a compact, all-metal design. A pair of bushings support each half of the rear axle inside the axle housing, and 12mm hex hubs secure the wheels. Up front, dogbones and slotted outdrives transfer power from the diff to the hubs.

• **Suspension/steering.** The Pajero's front end is basic stuff: a pair of H-arms hold hub carriers and steering knuckles that pivot on hinge pins, and one-piece camber links hold the pieces in check. Once again, the rear end is where the technical highlights are. Since the Pajero uses a straight rear axle, there aren't any separate arm mounts or independent suspension arms. What you will find are trailing arms and a pair of locating links that pivot on pillow balls to allow free suspension movement while simultaneously holding the axle perpendicular to the chassis' centerline. Once again, the system is very true to scale and entirely appropriate for a vehicle such as the Pajero.

Although the front and rear suspensions are very different, they

The Pajero's drive shaft is massive. The black housing on the front universal joint allows the drive shaft to telescope with suspension movement.

INCLUDED TEST GEAR

Tamiya AdSpec GP transmitter
The Pajero's included transmitter is a basic unit manufactured by Futaba with only trim knobs and servo-reversing switches for adjustments and a single red LED for a battery meter. But the case is very comfortable to hold, and the wheel and trigger have smooth actions. It's a solid system that's worth transferring to other vehicles later.

Tamiya TP-S3003 servos
These are identical to Futaba S3003s (surprise!) and are good for about 40 oz.-in. of torque—plenty for the Pajero's steering and 3-step speed control with reverse.

Tamiya 3-step mechanical speed control
An ESC would have been nice, but the 3-step control keeps the price of the truck down. A rigid plastic cover over the controller keeps it clean, and that should help it last a long time with proper maintenance.

540 Mabuchi motor
This is the quintessential "stock" motor, and it heavily favors run time over speed. But for beginning drivers, its tame performance is a plus: they'll hit stuff less hard!

THE COMPETITION

	Drive train	Slipper clutch	Ball bearings	Shocks*	Painted body	Speed control	Street price**	Reviewed
Kyosho Ultima ST ReadySet	2WD	No	None	Oil	Yes	Mechanical	$180	8/00
MRC Ironman RTR	2WD	No	None	Oil	Yes	Mechanical	$220	5/97
Tamiya XB Mitsubishi Pajero	**4WD**	**No**	**None**	**Friction**	**Yes**	**Mechanical**	**$190**	**2/01**
Traxxas Rustler RTR	2WD	Yes	Transmission	Oil	Yes	Electronic	$170	2/00

Cars listed alphabetically by brand. Sample of competitive vehicles; product category is too large to list all of them.

**All equipped with plastic bodies and coil-over springs. ***Approximate; price varies with dealer.*

have identical shocks. They're friction units, even though they use the same bodies, caps and O-ring seals as Tamiya's plastic, oil-filled shocks. You could install bladders and fill the shocks with oil, but the screw-type shock shafts will not accept a piston, and no piston equals no damping. Oh well.

The steering system is a standard double-bellcrank setup with threaded tie-rods for easy toe adjustments. A servo-saver is mounted directly on the servo.

• **Body, wheels and tires.** Here's where the Pajero shows off what Tamiya is best known for: scale detail. The body is beautifully molded and has crisp details that conventional vacuum-forming cannot duplicate: the undercut rocker-panel ribbing and front fascia detail, the deeply embossed grill openings and the rear spoiler are just a few examples. The decaling is also very precise—no wrinkles or bubbles, even where the decals pass over panel lines and other details. The separately molded rearview mirrors even have stick-on "glass." Very nice.

The Pajero's wheels and tires should be familiar to fans of Tamiya's 4WD stadium truck series, which also uses the same rolling stock. The wheels have a very realistic satin finish that doubles for aluminum, and the molded-in lug nuts look as if they could be spun off with a miniature lug wrench. The rims are sedan size but look much bigger thanks to the Pajero's authentic-looking, tall-sidewall treaded tires. White lettering reads, "BF Goodrich Radial Mud Terrain TA." I don't have an actual Mud Terrain TA tire to compare Tamiya's mini versions with, but they sure look right to me.

PERFORMANCE

I had the Pajero up and running as quickly as I could slip a stick pack into it and load eight double-As into the transmitter. The first mission was a speed run down the long hallway at the *Car Action* office. The Pajero launched hard with a squeeze of the trigger, but instead of squatting under acceleration, it lifted its right front wheel as the suspension loaded. Like a full-scale truck's engine, the Pajero's in-line motor torques the chassis from left to right—not front to back. The Pajero reached top speed almost instantly thanks to its low gearing, and it achieved a stately top speed of about 13mph. Suffice it to say, the 540 motor is not a speed demon. I soon ran out of hallway though, and I instinctively pushed the trigger up for brake, but since the Pajero is equipped with a mechanical speed control, there isn't any brake. Instead, I got full reverse. The Pajero's forward momentum and the carpet's high traction caused the truck to do a reverse wheelie, and for a few feet, it carried its rear wheels like a bucking bronco. This type of abuse is murder on tranny gears, but the Pajero didn't seem to mind; that's why I went ahead and blasted off a few more wheel stands in forward and reverse. Hey, I gotta test durability, right? The wheelies stressed the tranny, but nothing let go.

Banging the truck into filing cabinets and walls also tested durability. The slowest speed on the mechanical speed control represents a fairly hard stomp on the gas, and the Pajero has a relatively wide turning radius; this made it hard not to smack the truck into furniture when running indoors, so here's a tip: don't run it indoors!

With that in mind, I headed outside to where the real action was. On pavement, the Pajero will roll over if you try to corner sharply at speed, but it's a gradual roll and you can easily steer out of it. It's actually kind of fun to try to roll it onto two wheels and ride it out, but the body gets scarred quickly if you do this on pavement. Off the blacktop, the limitations of the short, undamped shocks became apparent, and the suspension bottomed out over just about every bump. The truck shrugged it off, but it is painful to hear the spring perches smacking the shock bodies.

I had the most fun with the Pajero when I scaled some piles of dirt and gravel at a nearby construction site with the truck's tenacious 4WD system. It's a lot of fun to see the suspension working realistically as the tires claw for traction, grabbing and pulling the truck one instant and then breaking loose and spraying a roost of dirt the next until cresting the top. For this kind of play, the torquey 540 and low gearing are ideal, and you can easily stretch a run to 15 minutes or more.

THE VERDICT

I had a lot of fun with Tamiya's Expert Built Pajero, but I don't think my endorsement is all that important. All you need to do is look at the truck; if its scale suspension and drive train and obvious high-quality construction appeal to you, you're probably already making plans for a trip to the hobby shop.

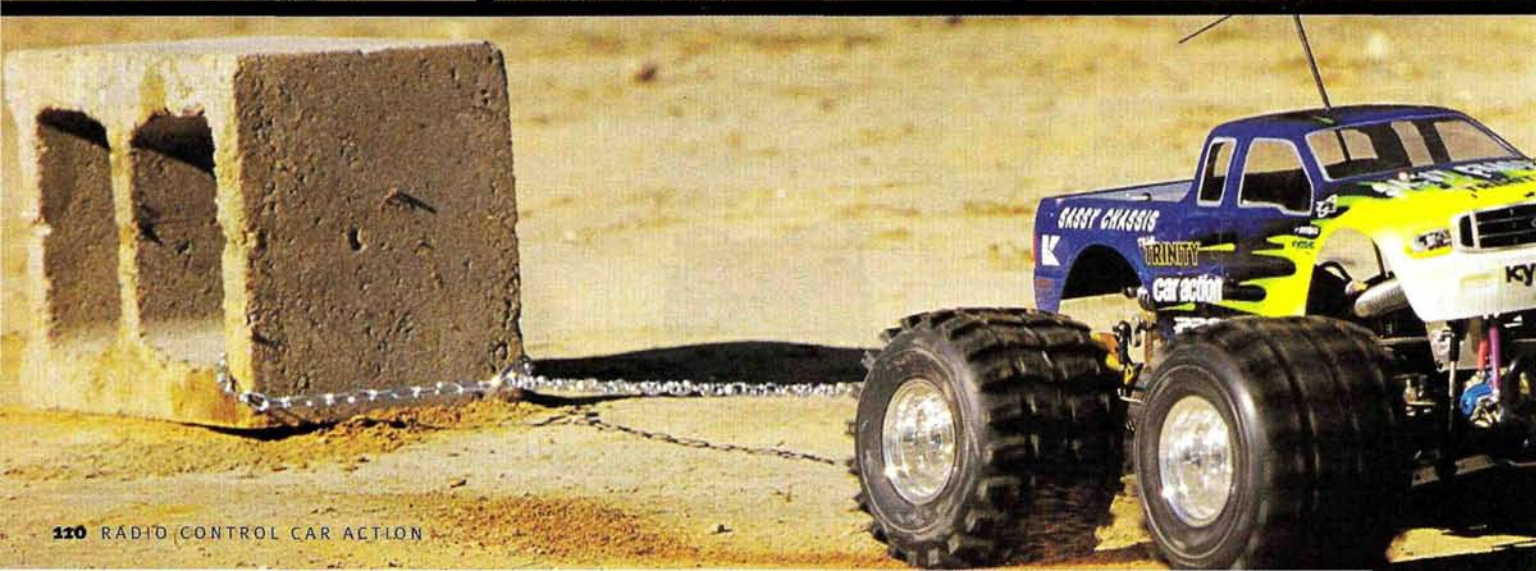
If you need a little convincing, I'll add that it is a very rugged machine that packs a ton of entertainment value into its compact chassis, and it really is "expert built"; the assembly is perfect. In addition to being plain ol' fun to bash around with, the Pajero's easy-to-work-on chassis invites you to take it apart to see what's going on inside. If you think driving the truck is cool, just wait until you wrench on it! The Pajero is much more than a shortcut to the backyard; it's a great introduction to what "real" RC is all about.

**Addresses are listed alphabetically in "Featured Manufacturers" on page 216.* ■

PROJECT

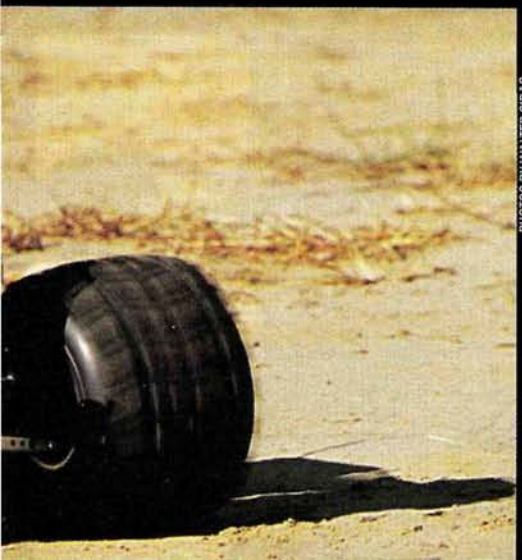
by Greg Vogel

FOR NEARLY AS LONG as Tamiya's classic Clod Buster has been on the electric monster truck scene, it's nemesis has been Kyosho's* USA-1. While the USA-1 can go toe-to-toe with a stock Clod, the aftermarket chassis that transform the Clod into a true performance monster truck leave a garden-variety USA-1 in the dust. What many truck fans don't know is that the USA-1 can also be radically hopped up, especially now that Sassy Chassis* is back on the scene. How hopped up can the USA-1 get? I think I pegged the needle; you decide.



USA-1

MAKING THE MOST OF KYOSHO'S MONSTER



PHOTOS BY WALTER SIDAS

SPECIFICATIONS

TOTAL COST $1,736.99

SINGLE-WHEEL SUSPENSION TRAVEL 5.5 in.

GROUND CLEARANCE AT MAXIMUM RIDE HEIGHT 3.85 in.

MINIMUM TURNING RADIUS 100.5 in.

WHEELBASE 13 in.

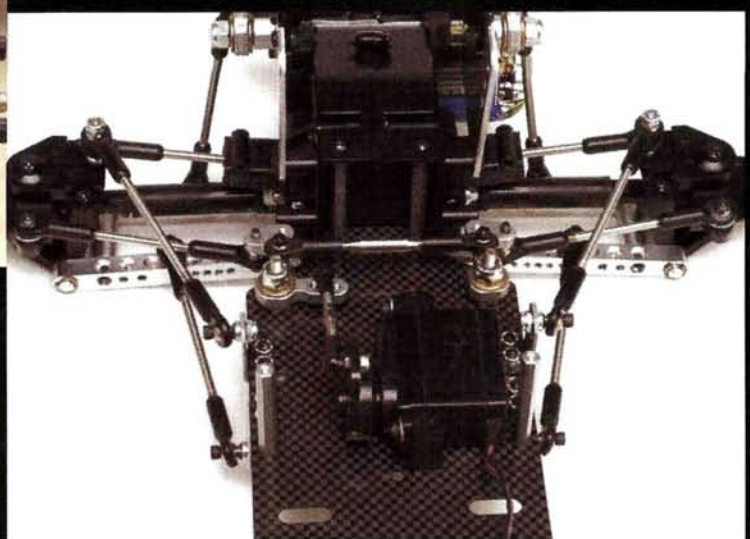
WIDTH 16.75 in.

WEIGHT AS TESTED 9.07 lb.

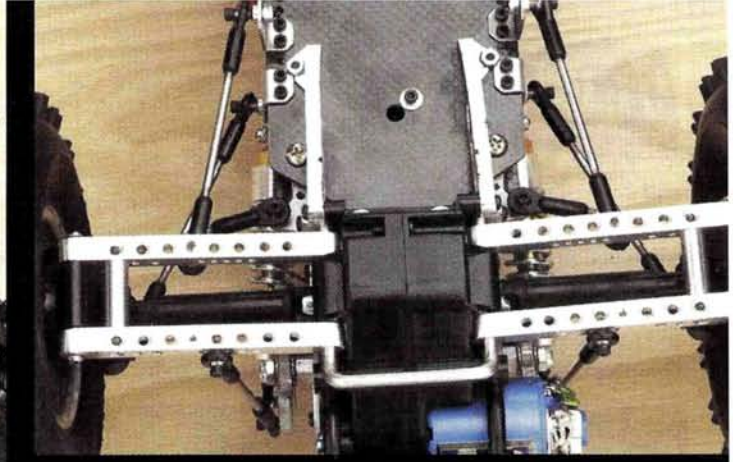
TOP SPEED 24 mph

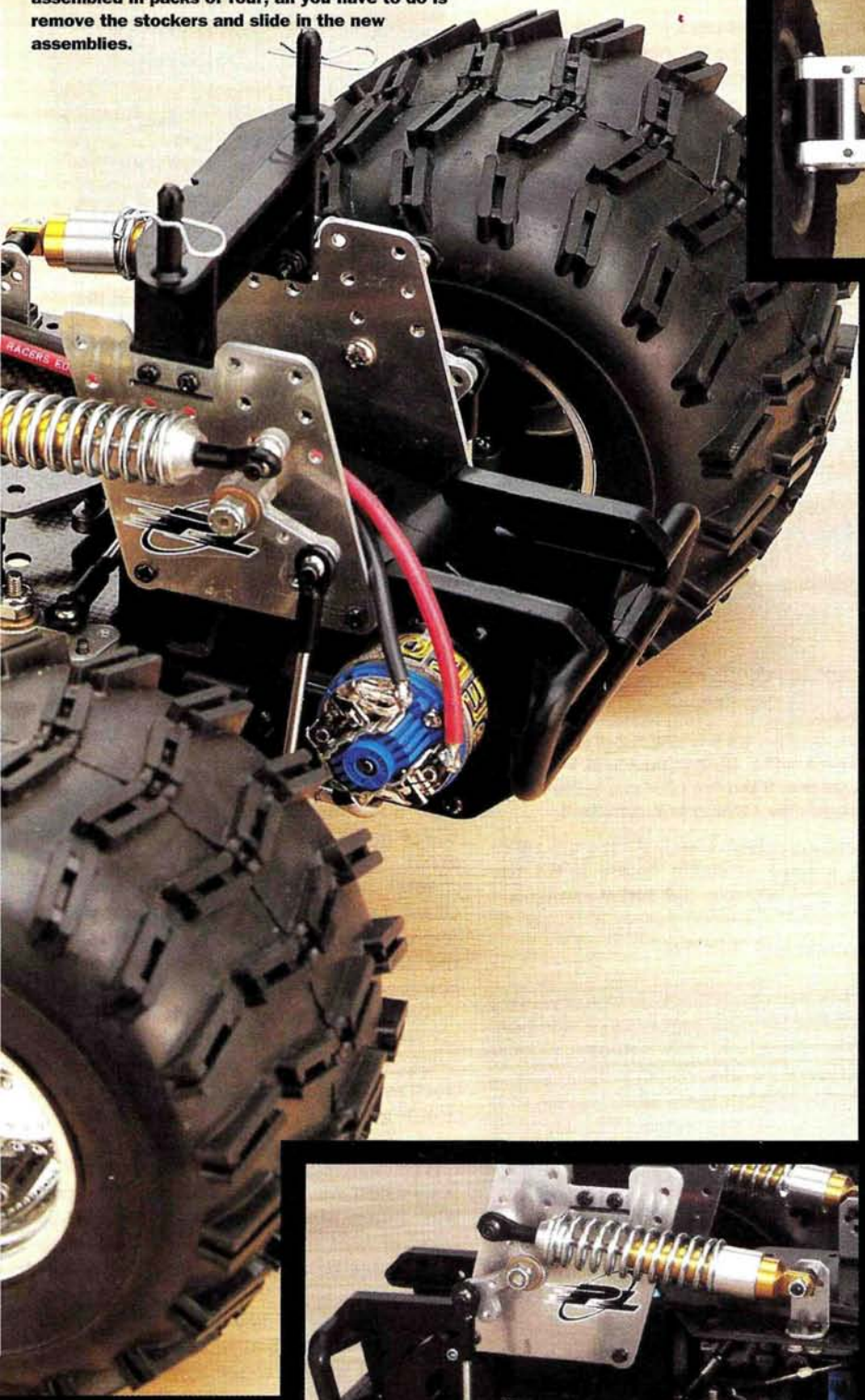
Two Airtronics 94257 servos take on the duty of steering the crusher. High torque servos should be your first upgrade.

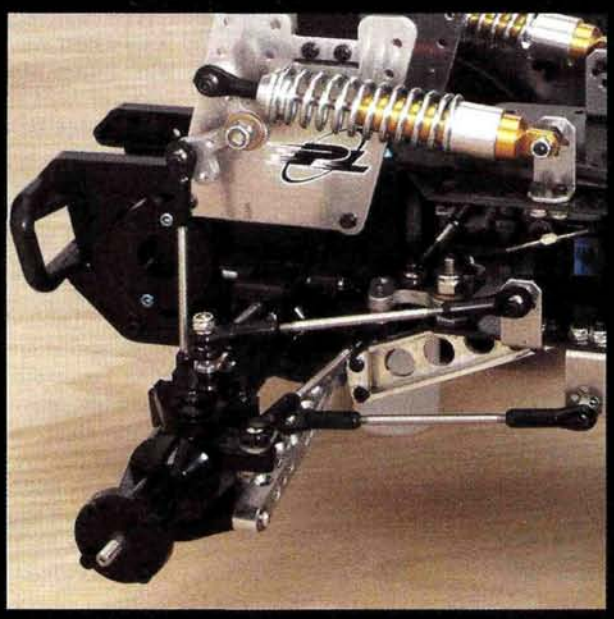
The Sassy Chassis universals use Traxxas sliders to transfer power to the wheels. We chained the truck to a cinder block and pulled the throttle to see if they would twist like the stock units. They held up to the test and proved to be the most important upgrade on the truck.



The Sassy Chassis suspension arms are actually individual aluminum girders joined by a standoff. Note the wide range of mounting points for the cantilevered linkage. The modified Traxxas telescoping drive shafts feature machined-aluminum universal joints and are a direct fit for the USA-1. Sassy Chassis sells the shafts assembled in packs of four; all you have to do is remove the stockers and slide in the new assemblies.







The Sassy Chassis super 4-link suspension system makes use of many L-brackets, ball ends and tie rods, all of which give the finished truck something of a hardware-store look, but everything works. The ⅛-inch-thick, woven carbon-fiber chassis plates have multiple mounting holes for the L-brackets. The chassis kit includes the plates, brackets, standoffs and all required hardware.

PARTS USED

KYOSHO
- USA-1 kit—part no. KYOC0242, $209.99.

AIRTRONICS
- Super Exes radio system, $259.99.
- Two 94257 servos, $99.99 each.

KEYENCE*
- A-07RZ ESC, $139.99.

TRINITY*
- Two Speed Gems 2 Sapphire motors—9212, $27.99 each.

PANASONIC
- 3,000 NiMH battery pack—$67.99.

SASSY CHASSIS
- Graphite chassis kit w/4-wheel steering—9959, $165.
- Cantilevered suspension—5003, $99.
- Super 4 link—5005, $90.
- CNC telescoping drive shafts with Traxxas* half-shafts—R101, $115.
- Aluminum extended lower arms—R102, $69.
- One-piece hinge pins—R103, $25.

PRO-LINE
- Giant Trac tires—1056, $24.99.
- F-350 super duty body for Traxxas T-Maxx—3096, $19.29.

PERRY'S HOBBY'S*
- Aluminum collars and retainers w/Bionic Springs, $37.50.

DURATRAX*
- Two 4-inch competition shocks—DTXC3501, $24.99 each.
- Ball-bearing set for USA-1—DTXC1372, $39.99.

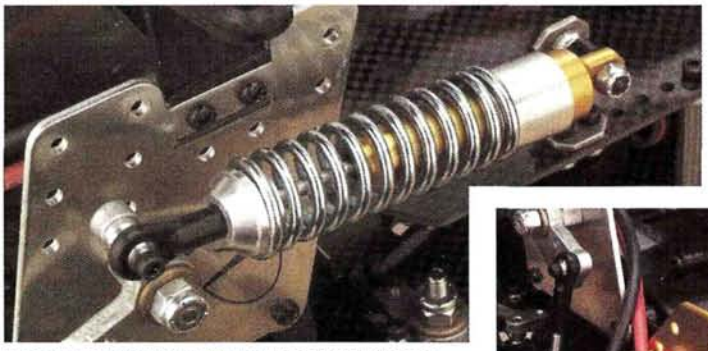
ROBINSON*
- Two 11-tooth pinion gears—0110, $2.95 each.

GS RACING
- Antenna holder—GSA00410PR, $5.99.
- Flanged nuts—GSN00230, $5.49.

DYNAMITE*
- Receiver pack—Dyn1411, $25.95.

PERFORMANCE

After we had taken the photos, I had to do some bench work before I could start testing the truck. I wasn't able to get the servo-reverser for the rear servo in time for the test, so I inserted the rear servo lead into the third-channel option. This allowed me to use the third-channel knob on my Airtronics* Super Exes stick radio to "crab" the truck.

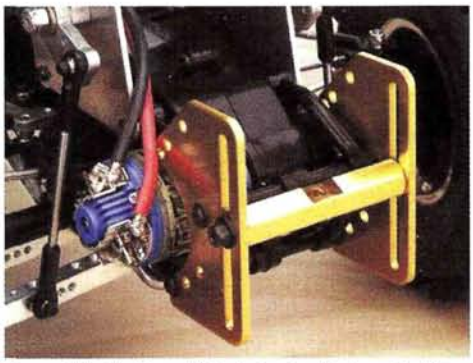


I set up my USA-1 with DuraTrax Gold shocks and Perry's Hobby's Bionic Springs and collars. These springs are a must for the Sassy Chassis cantilevered suspension conversion; ordinary springs are just too soft. I filled the shocks with 100WT oil to reduce the springy feeling that the heavy-duty springs caused. The truck launches and lands well with this setup.

I also installed a separate Dynamite 5-cell receiver pack because the power draw from the two motors made the radio gear glitch. Oh, and be sure to solder the front motor so it runs in reverse; when I yanked the throttle for the first run, the USA-1 tried to collapse into itself!

I went to a BMX track because it and the surrounding area posed many of the challenges I was looking for to give the truck a workout. First, I ran the truck around on flat dirt; considering I only used front-wheel steering, its off-power turns were tight. It showed an on-power push but, truthfully, I didn't care; all I wanted to do was run it over obstacles, and that's what I did next.

A steep dirt mound was perfect for some hill-climbing action. I backed the truck up to give it a head of steam before it hit the mound, and when it did hit, it climbed—high. It went pretty far before it started to lose traction and "diff out."



Sorry; this MaxTrax hitch is long out of production, so don't even bother emailing me to ask where you can get one. If you can't find one in your local shop's bargain bin, I think you're outta luck.

The Airtronics Super Exes radio was a great selection for this truck. Not only was it easy to get the truck dialed in, but also the third channel option came in handy to steer the rear. Using the third-channel knob on the top of the radio, I was able to "crab" the truck across the parking lot.

I cranked the wheels and brought it down. Then I ran through a battery charge by running it up and down this hill; I was just having too much fun.

Next it was time to send the truck through the air. With a fresh pack strapped in, I hit the throttle and sent the truck off one of the track's biggest jumps. It smacked down hard, but the suspension compressed only slightly. Although the Bionic Springs are stiff enough to hold the truck up, they are too stiff to allow the suspension to compress all the way.

In the air, the truck stays fairly level; the nose was sometimes a little high, but the USA-1 never went over backwards or nose-dived.

After depleting pack number two, the USA-1 and I moved on to a bed of rocks—a real challenge. For jumping and climbing, the truck had been on a surface that absorbed some of the impact of a rough landing; but running through rocks is brutal. Hit a rock dead on, and you're asking to break something. I did that, bringing the truck to a dead stop, but it pulled away with nothing more than a few new scratches on its nose plate.

This test was pure fun. Even though the suspension was minimal due to the super-stiff springs, the long chassis and wide suspension kept the truck fairly stable—even going over boulders almost as big as the truck itself.

For the last test, I had the USA-1 tug something heavy: I wanted to see what it could pull, and I wanted to see whether the drive train and new axles would be able to handle extreme stress. I chained the truck to a cinder block and pulled the throttle: the axles didn't twist, and the wheels just spun in the dirt. Next, I wrapped the chain around an old tire. The truck moved forward, took up the slack in the chain with a harsh snap and then dragged the tire about 5 feet. The snap as the chain was pulled taut jolted the truck hard, but it didn't show any sign of problems. The modified USA-1 is strong and tons of fun. It's a whole different animal from a Mod Clod!

**Addresses are listed alphabetically "Featured Manufacturers" on page 216.* ■

BEST USA-1 MODS

YOU DON'T HAVE TO BUILD A TOTALLY CRAZY TRUCK like mine to have real performance gains from the USA-1. The following mods can make a huge difference to your Kyosho crusher's off-road abilities.

▶ MORE MOTOR

Install a pair of machine-wound modified motors for an instant horsepower boost, but don't go for a super low wind; milder is better. Look for something in the 15- to 19-turn range. Check out the "Machine-Wound Mod-Motor Shootout" in *RC Car Action's* August 2000 issue for features and dyno readings on all the most popular mods.

▶ BEEF UP THE DRIVE SHAFTS

The stock shafts are about as stiff as a Twizzler. A warm Twizzler. Sassy Chassis telescoping universals aren't cheap, but they will transform the USA-1's drive line from wimpy to whoop-ass. Get some.

▶ INSTALL BEARINGS

Less maintenance, less friction, more speed, run time; you'll have all that when you install a bearing set. Mine are from DuraTrax*.

▶ REPLACE THE STOCK LINKAGES

The factory ball cups pop off much too easily. Upgrade to a set of captured ball ends from GS Racing* or Rocket City*.

▶ PUT MORE RUBBER ON THE ROAD

The stock USA-1 tires look good, but they don't grip as well as Pro-Line* Giant Trac tires. The solution? Install Pro-Line Giant Trac tires.

▶ SMOOTH OUT THE SUSPENSION

Replace the factory pogo sticks with oil shocks. I used DuraTrax 4-inch shocks; you could also use shocks from Associated*, Losi*, HPI*, or others.

▶ BEEF UP THE RADIO GEAR

You're not trying to maneuver your USA-1 with a wheezing, standard servo, are you? Install a servo with at least 90 oz.-in. of torque; better yet, install two. I bolted in a pair of Airtronics 94527s for right-now steering control.

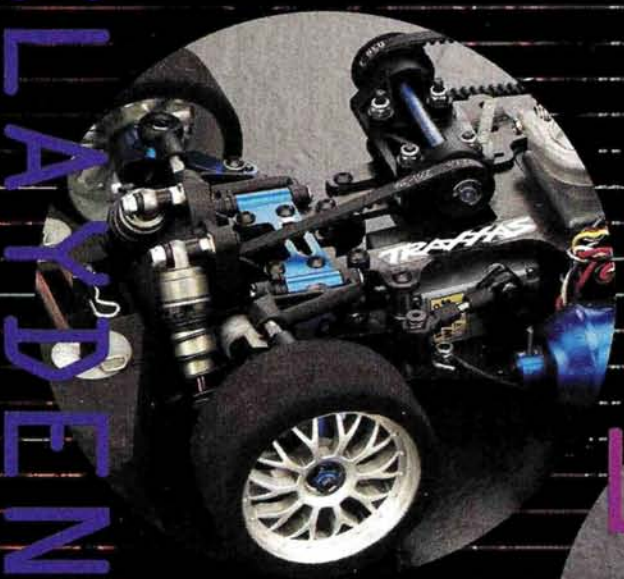
Factory Rides

by the Staff of *RC Car Action*

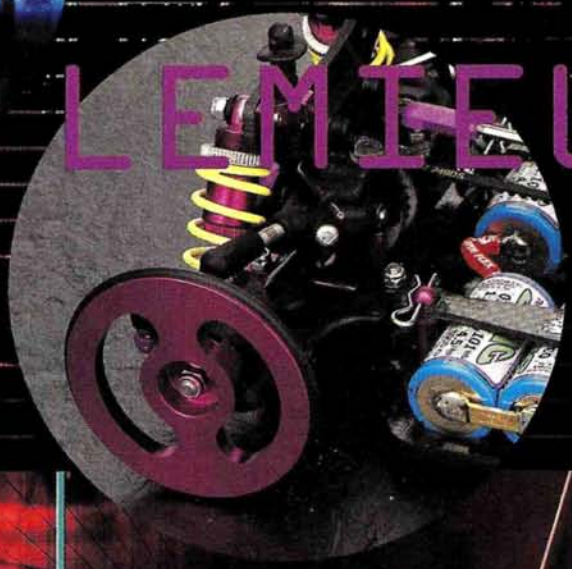
Pro setups you can use

If you're like most racers, you probably figure you have the whole how-to-set-up-a-car thing dialed. You tweak the chassis, bundle up the wires neatly, heat-shrink this, CA that, and you have a ready-to-race machine with no loose ends. Then you check out a pro racer's car, and there's all kinds of stuff you never thought of, but you know you definitely want to try them on your car. That's what this article is all about: stealing tricks from the pro's. If you don't learn something from the cars featured here, you must already be in the A-main with them!

SLAYDEN



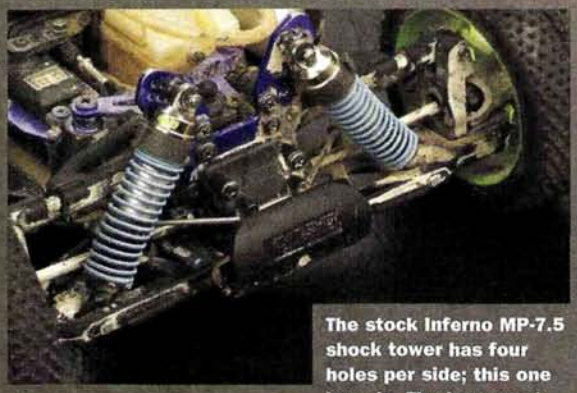
LEMIEUX



KANAI

Yuichi Kanai
Kyosho Inferno MP-7.5
2000 IFMAR 1/8-SCALE OFF-ROAD WORLD CHAMPION

It's no surprise that Yuichi knows his way around the Inferno MP-7.5—he designed the thing! It also stands to reason that if a guy has the chops to design a world-class 1/8-scale buggy, he can probably drive one pretty well, too. Yuichi more than proved that theory with his performance at the 2000 1/8-scale Off-Road World Championship in Las Vegas, where a blazing-fast, monster-jump-infested course tested the limits of man and machine. The setup shown here is straight from Yuichi's Worlds car. You can still see the Vegas dirt on it!



The stock Inferno MP-7.5 shock tower has four holes per side; this one has six. The innermost positions Yuichi used aren't possible with the stock tower.

MODIFICATIONS

- It's easy to imagine that, as a matter of pride, the designer of the MP-7.5 would race his baby mostly stock. Yuichi did just that, and his MP-7.5 looks entirely stock at first glance, but as always, there are mods to be found.

- If you look closely at the shot of the chassis' underside, you can see a bulge in it for clutch-bell clearance. The chassis lets the engine sit extra low, thanks to lowered engine mounts, and this helps lower the 7.5's center of gravity.

- The front shock tower has been replaced by a new model with additional shock positions. Again, no word if this will become a factory part, but it does looks like a production piece.

- The Inferno's fuel tank holds slightly less fuel than the IFMAR maximum-capacity rule allows, so a large fuel filter was added to increase the total capacity of the fuel system (IFMAR rules include the volume of fuel held by filters and the fuel line as part of the total fuel capacity).

- An additional stiffening rod, not included with the stock kit, was added to the chassis' front.

- Yuichi installed dual brake discs on each side of the center differential for more consistent, fade-free braking.

PHOTOS BY WALTER SIDAS

RACE GEAR

Transmitter	Futaba 3PJS
Receiver	Futaba
Steering servo	Futaba S9450
Throttle servo	Futaba S9450
Engine	RB Concept S7W
Manifold	RB Concept
Pipe	RB Concept 063
Fuel	Pro Spec 30-percent Nitro

SUSPENSION

	Front	Rear
Shock fluid	400WT	350WT
Springs	Blue	Blue
Pistons	2-hole	2-hole
Lower shock position	Inside hole	Inside hole
Upper shock position	Middle hole, lower row	Inside hole, upper row
Camber	-2°	-2°
Camber-link position (hub)	–	Outer hole
Camber-link position (tower)	–	Hole 4
Arm position	B, upper and lower	–
Toe	1° out	2° in
Swaybar	2.5	2.8
Hub position	–	Under
Steering-plate position	Hole C	–

DRIVE TRAIN

Clutch bell/spur	13/46
Clutch	2-shoe, soft spring
Diff fluid	700WT

TIRES AND WHEELS

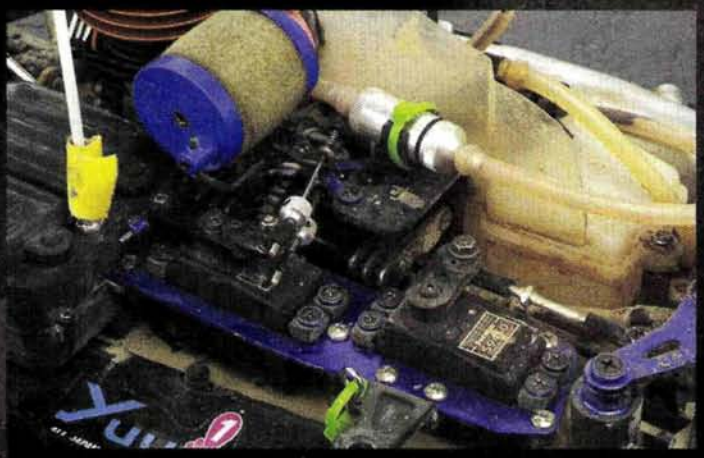
Tires	Pro-Line Crime Fighter
Wheels	Kyosho
Foam insert	Pro-Line

FACTORY OPTIONS/ AFTERMARKET PARTS

- Kyosho
  - rear universal axles–part no. IFW-114.
  - center universal axles–IFW-45.
  - 6-hole front shock tower–-IFW-116.
  - large-capacity fuel filter–1876.
  - front chassis stiffener–IFW-112.
  - turnbuckle camber link (F/R)–IFW-108/IFW-109.

How many of us skip the foam padding on the receiver? Yuichi isn't taking any chances. The tape on the receiver pack works as a handle for easier removal.

Big ol' hose clamps make certain Yuichi's Inferno doesn't blow a coupler. Check out the low-profile engine mounts.



Above: a few nice touches here. First, the wire-supported air filter (we all want one); second, the handmade splashguard; third, the large filter, which increases overall fuel-system capacity.

Left: the Vegas track was tough on the buggies, as shown here. When a hard-anodized chassis is scuffed like this, you know it's being slammed. Note the bulge in front of the flywheel slot; it allows clutch clearance when running low-profile engine mounts.

Steve Slayden
Traxxas Nitro 4-TEC Pro
ROAR ON-ROAD FUEL NATS A-MAIN

Steve came in third, but for a privateer, his finish is darn impressive and proof that trucks aren't the only nitro-powered Traxxas machines that can kick butt. Steve started with a Nitro 4-TEC Pro, but even an off-the-shelf Nitro 4-TEC can be dialed in like Steve's (it's a lot easier to start with a Pro, of course). Of all the race-prepped cars featured here, Steve's probably shows the most attention to detail.

The plastic blocks are original RC10 servo mounts, or more precisely, "undrilled hunks of nylon." The blocks were strapped to the arms as bump stops.

MODIFICATIONS

■ Steve removed material from the engine mounts where the engine-mounting screws thread in. That lowered both the engine and the overall CG.

■ Steve also custom-machined a Traxxas flywheel to make it smaller and to remove weight for better acceleration. He also serrated the flywheel with a knurling tool for proper grip when using a rubber starter wheel.

■ The receiver mount was installed farther back toward the engine (rear mounting holes) for easier access to the fuel tank. Steve replaced the graphite receiver mount with a molded receiver mount that was crafted from an old T-Maxx rear skidplate (no idea why—maybe to reduce the chance of glitching, but probably just for the cool molded-in TRX logo).

■ The stock throttle/brake linkage was replaced with a Serpent Impact throttle/brake-linkage setup.

■ Old-style Associated servo mounts are strapped to the back of the front suspension arms to prevent wheel lock when using the Power Line aluminum suspension arms (the stock suspension arms have molded-in ears to prevent wheel lock).

■ A custom-fabricated Kydex front bumper plate was added on top of the stock bumper for more protection.

■ The mounting flanges on the Traxxas 2.0 mesh wheels are ground down to allow foam tires to be mounted. Steve pre-coned the tires on a tire truer, so the outer diameter of the foam tires is slightly taller than the inner diameter. Tire wear is a big consideration when you run foam tires in a 45-minute Main event. With a slightly taller outer diameter, the tires will wear more evenly during the course of the race. Because the track had more right turns than left turns, Steve ran a stagger on the left front and rear wheels; the left tires are 1mm taller than the right tires.

SUSPENSION

	Front	Rear
Shock fluid	80WT	80WT
Shock piston	2-hole	3-hole
Shock length	66.5mm	67mm
Springs	Traxxas black	Traxxas black
Lower shock position	Outer hole	Outer hole
Upper shock position	—	Lower hole
Caster/anti-squat	6°	—
Camber	-0.5°	-1.5°
Toe	0.5° in	1.5° in
Swaybar	Position 2	Position 2
Steering-linkage position	Outer holes on steering knuckle; outer hole on bellcrank.	
Rear camber-link position	Lower inside hole on bulkhead; upper inside hole on hub.	

DRIVE TRAIN

2-speed (clutch/spur)	16T/41, 20/45
Clutch	T-Maxx with high-stall clutch shoes

TIRES AND WHEELS

Tires (F/R)	Ellegi 40-shore foam/35-shore
Tire diameter (F/R)	65mm/63mm
Wheels	Traxxas 2.0 mesh

BODY

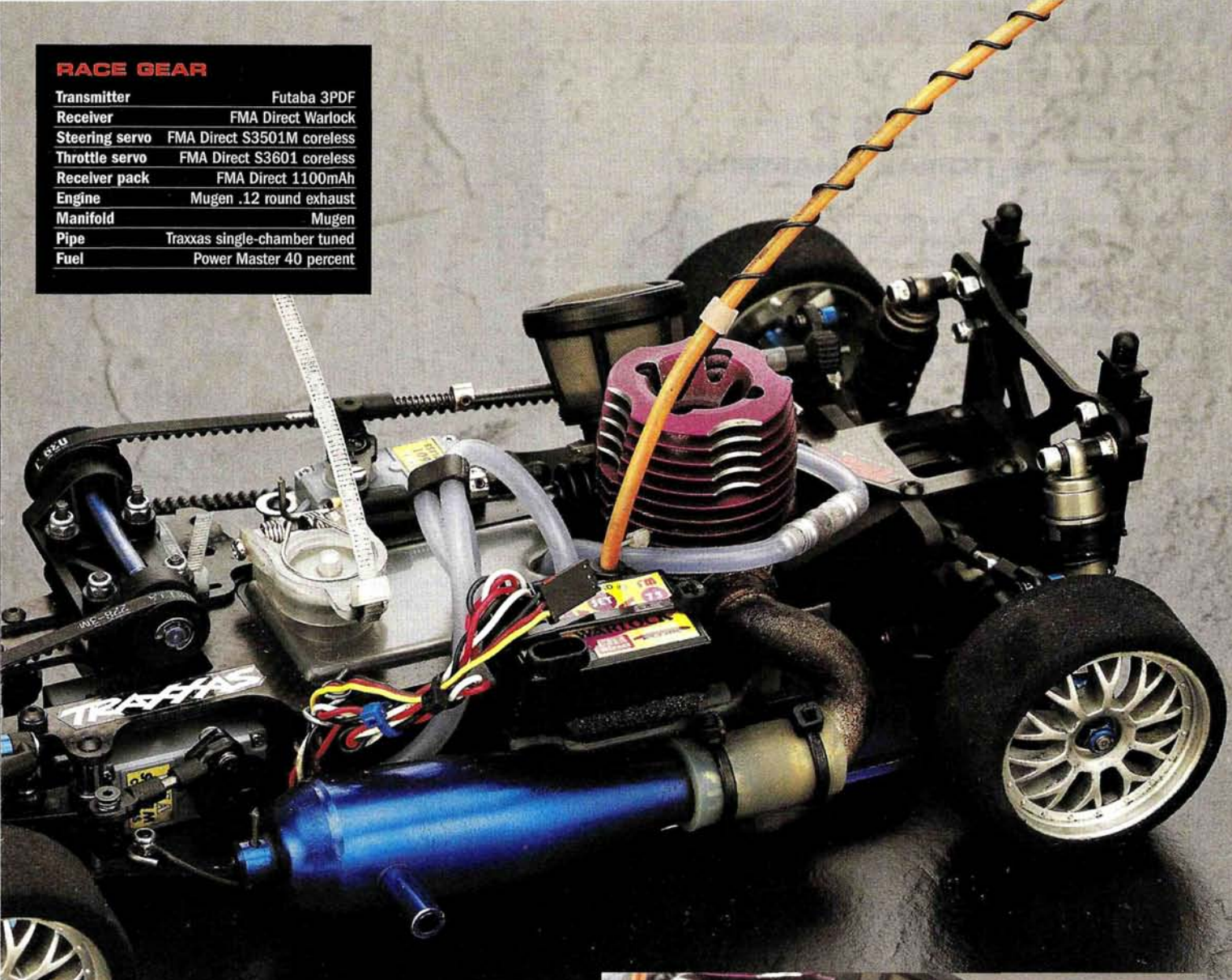
Protoform	Opel Vectra

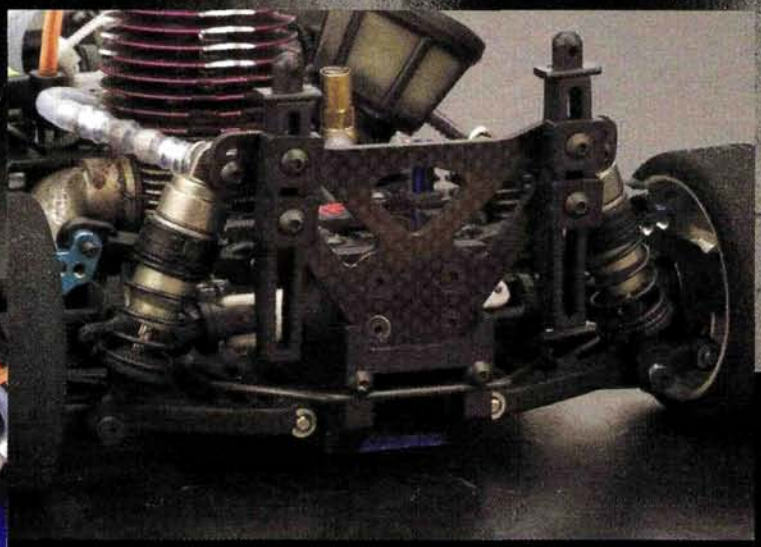
FACTORY OPTIONS/ AFTERMARKET PARTS

- **Power Line** aluminum parts
  - front suspension arms—part no. N4T1003.
  - steering knuckles—N4T1001.
  - upper arm mount—N4T1007.
  - rear uprights, 1.5°—N4T1002.
- **Kimbrough** medium servo-saver
- **Motor Saver** air filter
- **Sullivan** fuel filter

RACE GEAR

Transmitter	Futaba 3PDF
Receiver	FMA Direct Warlock
Steering servo	FMA Direct S3501M coreless
Throttle servo	FMA Direct S3601 coreless
Receiver pack	FMA Direct 1100mAh
Engine	Mugen .12 round exhaust
Manifold	Mugen
Pipe	Traxxas single-chamber tuned
Fuel	Power Master 40 percent





Above: the Traxxas Big Bore shocks and graphite rear tower are standard 4-TEC Pro parts and can also be purchased separately for any 4-TEC. Note the Power Line uprights tucked into the wheels.

Left: Steve used the latest primer-less tank in his 4-TEC and made a plastic receiver tray to replace the original graphite piece. The FMA Direct Warlock receiver is equipped with a fail-safe—always a good idea in a gas car.

Paul Lemieux
Schumacher Axis 2
NORRCA NATIONAL CHAMPION

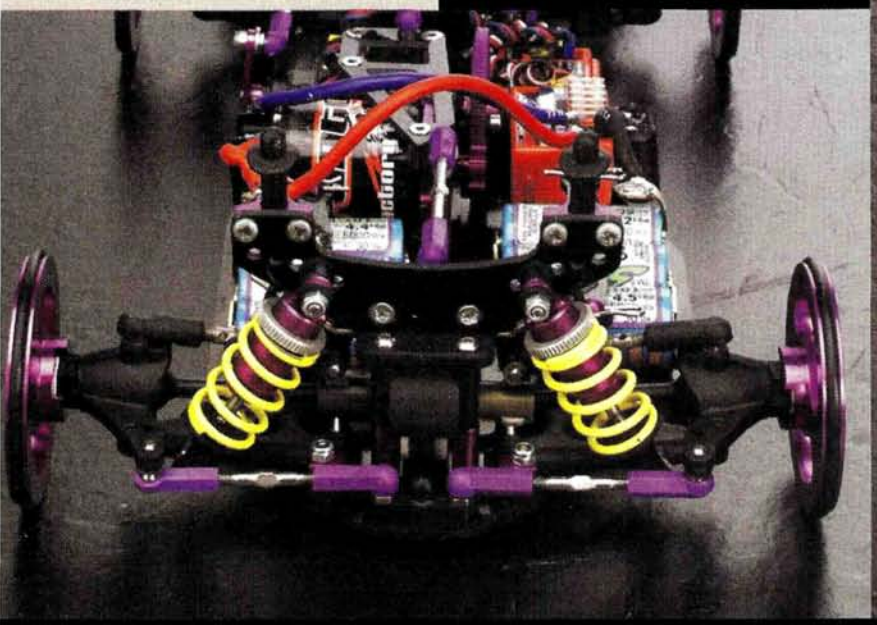
Never heard of Paul Lemieux? Now you can say you heard of him here, first. Paul is the reigning NORRCA National Champion for electric touring cars, and at just 16 years old, he has a long career ahead of him. Paul's Fantom/SMC-powered Schumacher Axis 2 is one of pro racing's prettier rides, and the setup featured here is straight from his NORRCA Nats win. The race was held at Delta RC Raceway in Antioch, CA, on a permanent asphalt track. If you're running an Axis 2 on blacktop, give Paul's setup a try.

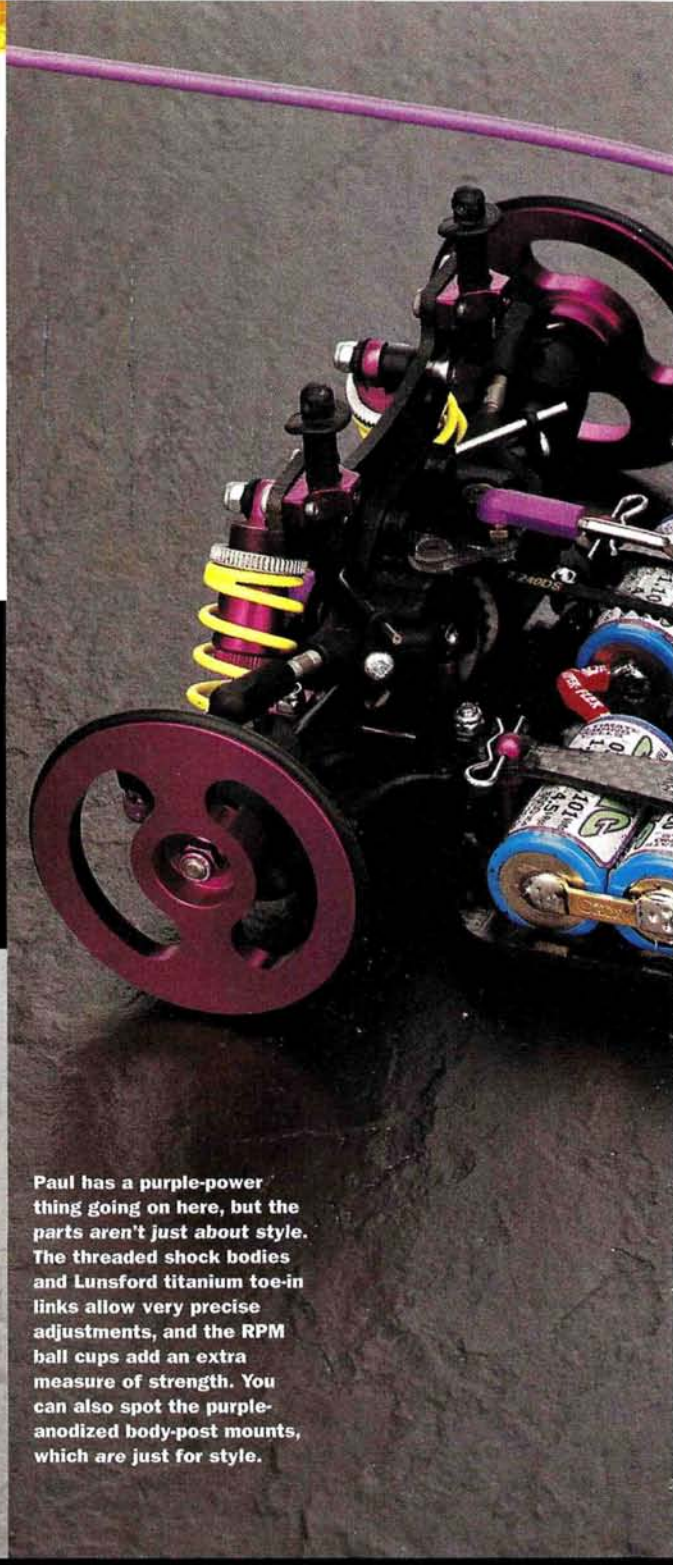
MODIFICATIONS

■ Basically, Paul's car is "stock." Granted, he has lots of purple stuff and aluminum parts on it, but in terms of setup, there are no custom-made, one-off parts, extra holes, or other personal touches. If you want to build an Axis 2 like Paul's, all you need is a ride to the hobby shop.

RACE GEAR

Transmitter	Airtronics M8
Receiver	Novak XXL
Steering Servo	Airtronics 94258
ESC	Novak Cyclone
Battery	SMC Panasonic 3000
Motor	Fantom 10x2





Paul has a purple-power thing going on here, but the parts aren't just about style. The threaded shock bodies and Lunsford titanium toe-in links allow very precise adjustments, and the RPM ball cups add an extra measure of strength. You can also spot the purple-anodized body-post mounts, which *are* just for style.

SUSPENSION

	Front	Rear
Shock fluid	Schumacher 60WT	Schumacher 60WT
Springs	Schumacher yellow	Schumacher yellow
Lower shock position	Outer hole	Outer hole
Upper shock position	1/2	1/2
Camber	-2°	-2°
Toe	None	2.5° in
Swaybar	None	None

DRIVE TRAIN

Pinion/spur	Trinity 116T spur/Robinson 30T pinion
One-way pulley	No (full-time 4WD)
One-way diff	No (full-time 4WD)

TIRES AND WHEELS

Tires	Yokomo G
Wheels	Schumacher 24mm
Foam insert	Yokomo firm

BODY

Protoform	Stratus

FACTORY OPTIONS/ AFTERMARKET PARTS

- **Schumacher**
  - graphite/aluminum battery hold-downs–part no. U2218.
  - threaded shock bodies–U2297.
  - aluminum arm mounts–U2365.
  - aluminum lower bulkheads (F/R/center)–U1745/U2164/U2236.
  - aluminum body-post mounts (F/R)–U2165/U2166.
  - aluminum spur-gear mount–U2252.
- **RPM** purple ball cups–73378.
- **Lunsford** turnbuckles–various part numbers.
- **Robinson** purple pinion 64P, 30T–3130.
- **Take Off** antenna holder–U2096M.

The Axis 2's front bulkhead projects from the chassis, so it takes a lot of abuse. Paul installed Schumacher's aluminum front bulkhead for extra strength.

It isn't unusual to find Novak gear in a factory driver's car. Items of note include the double-capacitor setup, the aluminum spur-gear mount and the Take Off antenna holder.

Paul made sure all Airtronics 94258 servo's turning power makes it to the front wheels: he installed machined-aluminum servo arm. The aluminum center bulkhead is also visible. Schumacher's setting wheels feature large slots for pivot-ball access on cars equipped with them.

Addresses mentioned in this article are listed alphabetically in "Featured Manufacturers" on page 216. ■

RACER news

by Greg Vogel and Derek Buono

Schumacher Axis 2 makes a strong debut at NORRCA Nats

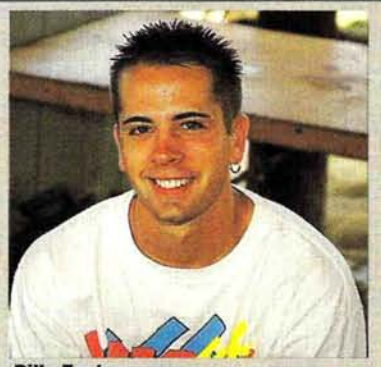
The Axis 2 made its official U.S. debut at the NORRCA Nationals at Delta R/C in Antioch, CA. Team drivers Paul Lemieux and Paul Wynn finished first and second in the Factory Modified Touring class. Paul Lemieux set the TQ and battled with Wynn to take the overall victory in the third Main. Schumacher's SST touring car series has now won eight national titles.

1 Paul Lemieux	Schumacher Axis 2
2 Paul Wynn	Schumacher Axis 2
3 Mike Swauger	Express MK-3
4 Mike Bruce	Yokomo MR-4TC Pro
5 Don Vinkemulder	Schumacher Axis 2

Congratulations to Team Schumacher on the win. The top five NORRCA National finishers are listed at left.

Reedy Round-up

The Reedy Truck Race of Champions was held in HotRod California from October 27 to 29. Brian Kinwald won the electric class with his Trinity-powered Losi Triple-XT, while Billy Easton took home the win in the Gas Truck class with his Team Associated RC10GT. The weather on Sunday was cold and rainy, and that made the racing even more intense as racers covered themselves and their equipment with plastic bags ... or were they just dressing up for Halloween? Congratulations to Brian and Billy on their wins.



Billy Easton

Brian Kinwald

Nitro TC3 Update

At the recent Chicago trade show, Associated unveiled the Nitro TC3, which we shot for the January issue. During the show, a lot of suggestions were made by show attendees concerning changes they would like to see made to the car. Associated took the prototype NTC3 back to the workshop, dismantled it and is working around the clock on some changes resulting from those suggestions. We were assured that the car will be finished in time for the estimated release date, between April 15 and May 30.

Swauger joins Team Fantom/SMC

Fantom Racing scored another big-name driver with the addition of Mike Swauger, who joined Fantom/SMC in November 2000. Mike will be running Fantom motors in his Xpress Roadrunner. His first big race was the ISTC World Cup in Hong Kong.

New leadership for NORRCA

David Goss and Billy Bowerman are the new co-presidents of NORRCA. Since assuming their leadership roles in October 2000, David and Billy have been actively contacting track owners, and they stress that the organization will target average racers and make it easier for them to compete by implementing programs such as spec tires and motors for certain sportsman classes in an effort to cut racing costs. The proposed rules have been voted on and approved by the members. Look for a new set of NORRCA races, not only with the big-name drivers, but with local guys sharing the limelight, too. For more information, visit www.NORRCA.com.

SITE SEEING

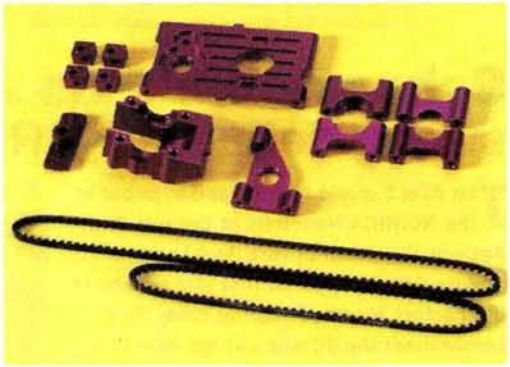
WWW.MOTIONGRAPHICSWEB.COM

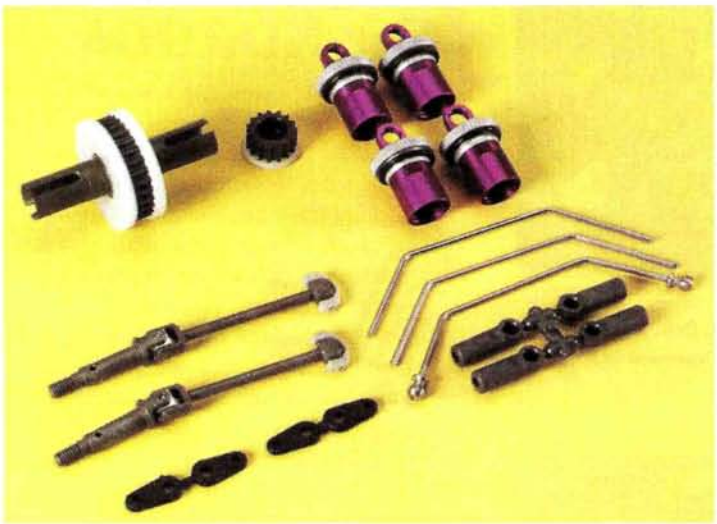
If you've been reading *RC Car Action* for a while, you've probably noticed the Motion Graphics paint jobs on many of the test cars. Richard Muise, the man behind Motion Graphics, has taken his painting business to the Internet, and the site offers more than just pretty pictures. In addition to a gallery, there's a table for estimating the cost of a paint job, info on ordering a painted body and a selection of custom-finished, assembled kits available only from Motion Graphics.

SPEED SHOP

Schumacher Axis 2 optional parts

The Axis 2 is well equipped out of the box, but just in case you need some hop-ups, Schumacher already has a full slate of parts to trick out the Axis 2. Luckily for Axis owners, most of the parts work with both the Axis and the Axis 2, so you can use all your old hop-ups if you upgrade to the A2.





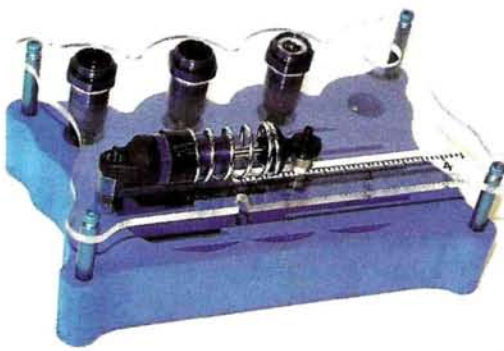
Front one-way—part no. U2294Y, $59.99.
Threaded shock body and collar set—U2297C, $45.
Alloy transmission front lower—U1745Z, $54.50.
Alloy rear diff lower—U2237F, $22.50.
Alloy top transmission lower—U2164U, $19.95.
Alloy motor mount—U2236E, $39.95.
Alloy gear adapter—U2252Y, $14.50.
Steel universals (pair)—U21151D, $39.95.
15T alloy rear pulley—U2019W, $18.95.
Tungsten carbide thrust bearing—U1954V, $13.95.
Alloy pivot blocks—U2365G, $14.99.
Ball-bearing steering set—U1248V, $12.95.
Competition roll-bar set—U2245P, $13.99.
Speedflex front belt (F/R)—U2241K/U2240J, $9.95.
Caster clip set—U2251X, $4.99.

Team Losi Triple-X Phobia body

The stock Triple-X body was as sleek and low slung as they come—until now. Losi's new Triple-X Phobia body fits the body so snugly, it almost looks watertight. You'll be happy to see that the body comes complete with wing and window masks to cut down on prep time.
Triple-X Phobia body—A8041, $18.

Trinity shock dyno

Trinity's new shock-building "dyno" holds a full set of shocks with its Plexiglas top and foam bottom. A built-in slide ruler allows you to build all four shocks the same length, or snap a ball stud on and use it to build tie rods. Two versions are available for touring car and off-road shocks.
Touring car shock dyno—RC1020, $12.99.
Off-road shock dyno—RC1021, $14.99.



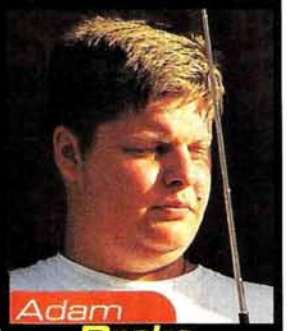
Trinity Black Death comm drops

According to Trinity, the Black Death drops reduce brush/comm friction to a minimum, and that can lead to higher rpm—exactly what every speed freak is looking for.
Black Death comm drops—C0186, $4.99.

Kimbrough pin cushions for TC3

The pins in your axles could be damaging your outdrives! Kimbrough's new plastic pin-cushion set replaces the stock metal pins and reduces slop and wear on both axles and on the outdrives.
Pin cushions—126, $4.

5 QUESTIONS



Adam Drake

Age: 21

Last big win: 1999 Reedy Truck Race

Home track: So Cal Raceway

Sponsors: Losi, Trinity, Novak, JR, MIP, Lunsford, Jammin, OFNA, Picco, A-Main Bodies, Hobbystop West, RADZ

When I'm not racing: I practice and prepare for the next race

RC Car Action: You seem to be a real diehard racer who would do anything to get to a race or even just to a practice. What extremes have you endured to get some track time?

Adam Drake: During a huge winter storm, a bunch of us traveled three hours to a club race. The snow was coming down so hard, the wipers couldn't keep up; we had to reach outside and scrape the windows as we were going. It was a tough journey, but when I have the race bug, nothing will stop me.

RCCA: Rumor is, you practice all the time. Do you feel it's necessary for you to practice constantly to maintain your current skill level, or do you just enjoy practicing?

AD: I don't feel I have a natural ability for racing. To make the A-main and continue to improve my driving skills, I have to practice. I make up for my lack of natural driving skills with a lot of hard work and long practice sessions.

RCCA: What is a good tip for someone who's just getting into racing? How should they approach changing their setup for a track?

AD: First of all, what works for one driver may not work for another; Brian Kinwald doesn't copy Matt Francis. Get a starting point where you feel comfortable driving, and tweak the setup to the track conditions. Most pro drivers have a starting point that they make all their changes from. Find out what works for you.

RCCA: What about your new job at Losi; how is that going for you? Is it all play, or is there some hard work involved?

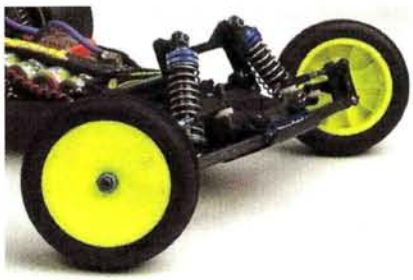
AD: I really like working for Losi, but like any job, it requires hard work and dedication. Sure, there are days when I think, "I'm getting paid to test-drive an RC car!", and that's great, but other days, it's all business.

RCCA: You ran for OFNA at the recent ⅛ Off-road Worlds. How was the car? What did you think of the track?

AD: The track was incredible! Huge, with huge jumps. It was really the most intense durability test for any car. The Ultra Worlds 2 held up well and worked great. Mike Dunn and Jay Halsey have been running the car for a while and knew how to get the car competitive quickly. I was very pleased with its performance.

UNDER THE HOOD

"THE DRAKE'S" LOSI TRIPLE-X BUGGY



Adam's car is ready for the front swaybars to be bolted on. He added threaded shock bodies for quick and easy tuning. Check out the large axle nut; with a threaded insert, he was able to use the same size nut as on the rear axles.

The rear clip of the car is pretty much stock except for the polished titanium screws and the Trinity aluminum body mounts. The Trinity aluminum pivot blocks replace the stock blocks for increased durability.

FACTORY OPTIONS

■ Trinity 0-degree aluminum pivot block–part no. TK5015 ■ threaded shock bodies (0.6/0.9 in.)–A5054/A5055

HARD-CLAY SETUP

	FRONT	REAR
Toe-in	1°	3°
Ride height	Arms level	Bones just above level
Camber	-1°	-1°
Camber-rod location		
–hub	B	A
–bulkhead	3 (1 washer under ball stud)	2
Caster	25°	–
Spindle height	Bottom	–
Rear hub spacing	–	Center
Front axle spacer	Narrow (inside)	–
Swaybar	None	None
Ackerman location	Outside (1 washer on spindle)	–
Shocks		
–fluid	30WT	30WT
–piston	No. 56	No. 56 drilled
–spring	Silver	Red
–limiters	0.030 inside	0.050 inside
–mounting location		
(upper/lower)	No. 2/middle	No. 2/inside

MODIFICATIONS

The only major modifications Adam made were the addition of Trinity rear pivot blocks for added durability (for which he shimmed the front for 1 degree of anti-squat) and a threaded insert in the front wheel nuts so they could use the same size nuts as the rear axles. For easier adjustments, he also used threaded shock bodies.

EQUIPMENT

RADIO: JR Racing R1
SERVO: JR 8542
ESC: Novak Cyclone
RECEIVER: Novak XXL
BATTERY: Trinity Sanyo 2400s
TIRES: Team Losi Xtra Wide (red)/Team Losi Taper Pin (red)
MOTOR: Trinity 13x1
INSERTS: (F/R)–Losi full firm/Trinity B2 firm
PINION/SPUR: 25/92

HOT MOD HOW TO

ADD BATTERY HOLD-DOWNS

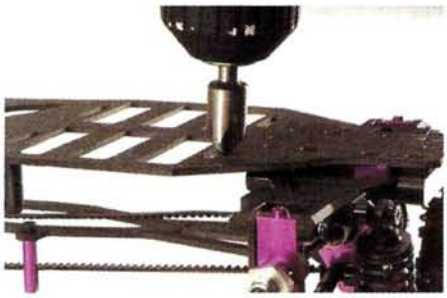
It never fails: whenever you use tape to strap a battery pack into a sedan, the tape either sticks to itself, sticks to your hand, or sticks to some tool on the bench. All sedans should come with built-in battery mounts so we can put away the tape forever.

If you use tape to hold the cells in your car, here is a more convenient hold-down system. We're going to install Schumacher plate straps in a sedan whose cells were originally taped in; you can retrofit similar systems from other cars, too.

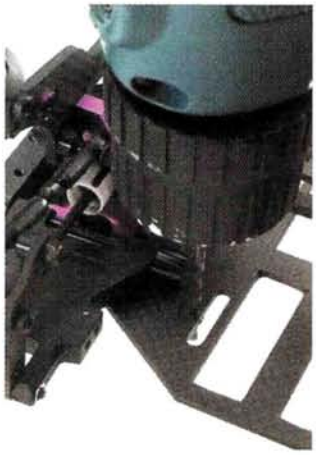
YOU'LL NEED

- Schumacher battery strap kit—part no. U2218H
- 90-degree countersink bit
- ⅛-inch drill bit
- power drill or drill press

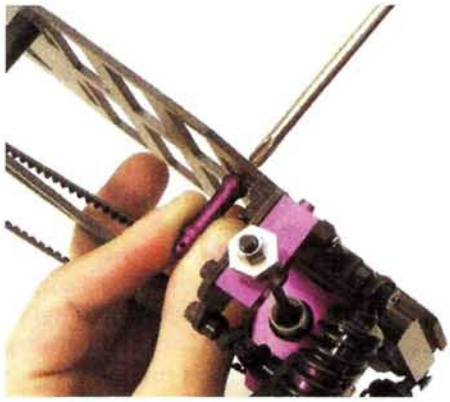
■ **STEP 1.** With the battery pack out of the car, perfectly center the strap over the three battery slots. Using the holes in the strap as a template, mark the chassis for the mounting screws.



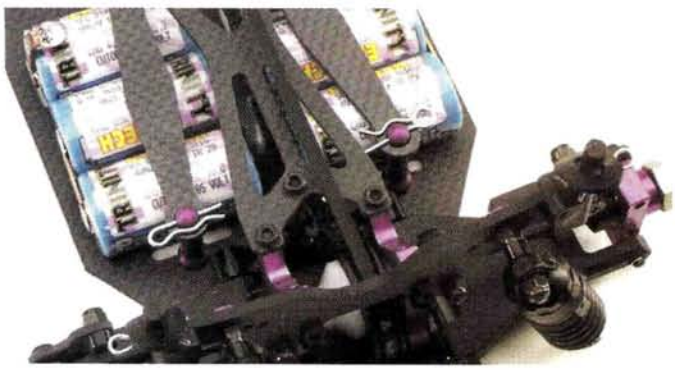
■ **STEP 3.** Flip the chassis over and use a countersinking bit to make a countersunk hole for the posts' flat-head screws. If you don't have a countersink, secure the posts with button-head screws.



■ **STEP 2.** Using the ⅛-inch drill bit, drill through the center of the marks. To reduce the chance of splintering the chassis, drill slowly.



■ **STEP 4.** Install the posts using the supplied flat-head screws.



I think you'll agree that changing batteries with this setup is much easier. All you have to do is remove the body clips, and the batteries will be easily accessible.

LAST LAP

What is the one piece of equipment in your toolbox or pit bag that you couldn't live without?

Besides the main stuff—car, radio, batteries, charger, etc.—I would have to choose something I use every time I race: thread-lock. Somehow, the important screws are the ones that come out the most. Thread-lock is a savior. Say it's the last minute of a 10-minute gas-truck Main; you're tied for first, then all of a sudden your car barely moves, and you hear the most God-awful noise: it's your spur gear stripping because your engine-mounting screws came loose. It happens to the best of us; that's why thread-lock is the number-one item on my list of must-haves. Gas and electric racers both need it.

—James Pradun

The one piece of equipment I couldn't live without is a screwdriver. Believe me, it's really embarrassing to run around the pits asking for a simple screwdriver!

—Tony Salerno

I could not race without a picture of my girlfriend. Her photo encourages me to do my best and not crash.

—Robert Lankford

Editor's note: does your girlfriend know you consider her a piece of equipment?

My B3 tuning guide!

—Steve Parkosewich

It's absolutely my Snap-On ratcheting screwdriver; I use it all the time.

—Mark Brooks

Toilet paper.

—Michael T.

The one very important piece of equipment that I can't race without is my reclining lawn chair! I love to race, and I tool around some with my car during the day, but most of my time is spent kicking back and relaxing. Hey, this is a "hobby"; I'm here to have fun and unwind from my hectic day-to-day work life. Live long, race hard, but have fun doing it.

—Justin Koffler

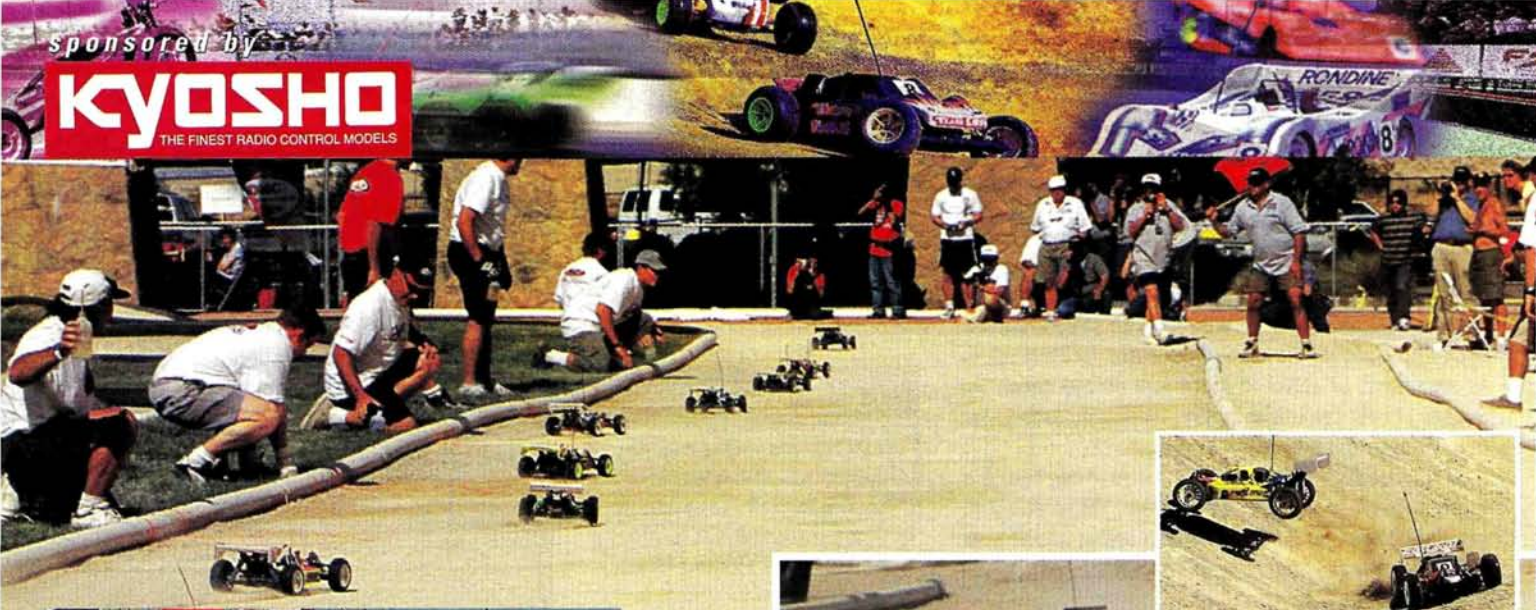
Toolbox? Pit bag? I don't use either one. I just invest in carpenter's pants that have a lot of pockets. I'm a walking Snap-on toolbox. Am I the only one who does this? Plus, I enjoy sitting down in my real car when it's time to go home and getting stabbed in the side by a Phillips screwdriver. Seriously, though, I don't think there is anything in my toolbox that I can't live without. It seems that every time I race or drive my cars, I need something different out of my box.

—John Shannon

NEXT MONTH'S QUESTION

You're in second place when you and the leader tangle with lapped traffic. The marshal puts you back on the track first. Do you take the lead, or give the leader his position back?

Respond by clicking "Last Lap" at www.rccaraction.com, or email your responses to gregv@airage.com.



Here are the A-main drivers with their cars.

PHOTOS BY GREG VOGEL

by Greg Vogel

IFMAR

1/8-SCALE OFF-ROAD WORLDS

Kanai Dominates with the Kyosho buggy he designed

Las Vegas—land of big hotels, casinos, gambling, bright lights and Wayne Newton—was home to the 1/8-scale Off-Road Worlds, and it couldn't have been held in a more appropriate place. Racers from all around the globe traveled to the Silverton Hotel to gamble with their driving skills until one driver walked away with the World Champion title.

The event was absolutely spectacular. The enormous track was constructed in the hotel's parking lot. All of the racers stayed at the Silverton or in the adjacent RV park. A nearly four-stories-high drivers' stand towered over the track and was covered with sponsors' banners—GS Racing, Kyosho and Thunder Tiger, just to name a few. The track was hard-packed clay with enormous car-wrecking jumps for the drivers to negotiate. The lanes were divided by the usual drainage pipes, and a grassy center field gave it a professional look. Although some drivers preferred to pit in their rooms, a huge, circus-type tent with tables and chairs was also provided.

A-MAIN SUMMARY

The hype was all on Mark Pavidis through qualifying and into the Main. He won four straight qualifiers and set down his O'Donnell-powered Kyosho 7.5 in the TQ position for the A-main.

All eyes were on Pavidis as the start of the race neared. The tone sounded, and the field was off. It was an incredible race. Pavidis had the lead in the early stages but bobbled a few times and allowed Jeremy Kortz to get by. Pavidis, Miguel Matais and Yuichi Kanai followed Kortz closely; that's when the racing got intense. Pavidis took the lead again, but it lasted for only a few laps. He rolled his car and allowed Kanai to get by. There was no doubt that Kanai was on fire; he had fast pit times and followed up with some very fast lap times. Kanai pulled his 7.5 into a huge lead and went on to take the win.

If you weren't there, you missed some exciting racing and some classic moments in the pits, but you can still get in on the action. For the full race coverage and tons of pictures, check out the next issue of *Radio Control Car Action*.

**Addresses are listed alphabetically in "Featured Manufacturers" on page 215.* ■

The awards presentation was held after the Main. Here's the new IFMAR 1/8 Off-road World Champ Yuichi Kanai, designer of the MP 7.5.

RACE RESULTS

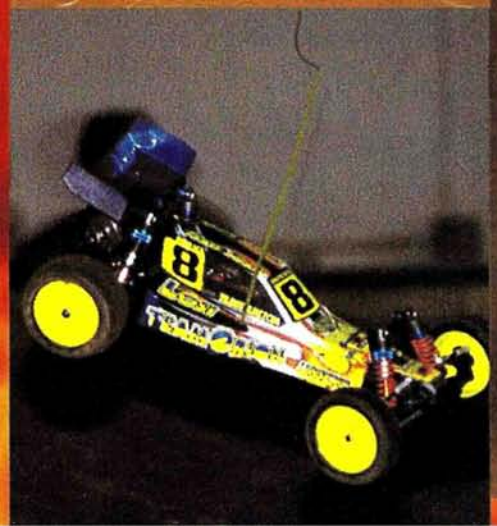
FINISH	NAME	COUNTRY
1	Yuichi Kanai	Japan
2	Daniel Reckward	Germany
3	Miguel Matais	Portugal
4	Mark Pavidis	USA
5	Greg Degani	USA
6	Derek Furutani	USA
7	Marc Ibars	Spain
8	Jeremy Kortz	USA
9	Jason Ashton	USA
10	Marco Grandesso	Italy

PRO-LINE

Endless Summer

Classic

by Greg Vogel



A Race to Remember

Sponsored by
- **Pro-Line**
- **Reedy**
- **Radio Control Car Action**

Every year, when I read the magazine's coverage of the Pro-Line Endless Summer Classic, I hoped that one day, I'd be sent to cover it—maybe even race in it. In 2000, my wish was granted; I was there! But this particular event turned out to be far more significant than I had anticipated. It was the last race held at MnM Hobbies, Corona CA; the day after the Classic ended, it closed its doors for good.

Well over 200 entrants showed up; because of this, some had to set up their pits outside the raceway. A food vendor kept the racers stuffed, while the inside racers were stuffed into their pit spaces, which almost completely surrounded the track. The rest of the racers took advantage of several rows of tables along the front of the building. At the well-stocked hobby shop, track owner Joe Stanovich attended to the racers' needs. The announcers were on the top tier of the drivers' stand while the a tech crew was stationed underneath to distribute and collect transponders and to tech the cars. The track layout and crew were perfect; the show went off like clockwork. Now that you have a picture of the venue in your mind, try picturing the intense racing of the Modified Mains.

MODIFIED A-MAINS

Buggy. At the start, Jason Corl sat on the pole and was flanked by Brian "the Dirtinator" Kinwald. At the tone, Corl got a little holeshot but Kinwald quickly overtook and planted his Trinity-powered Losi Triple-X firmly in the lead. After some first-lap mixing, Chad Phillips followed Kinwald, and Travis Amezcua was behind Phillips. For a few laps, nothing changed, even though Amezcua got hung up for a second. Adam Drake followed the leaders closely with Jason Corl behind him. An up-front pile-up allowed "The Drake" to take his Losi Triple-X to second; Amezcua was behind him and Corl was in fourth.

At close to the 2-minute mark, Kinwald had a commanding lead but Corl was laying down notable lap times in third. Then Drake bobbled and Amezcua pulled ahead into second. Just as that happened, Kinwald got hung up with a driver pulling off the track, and that allowed Amezcua's Orion-powered Losi Triple-X to close up on Kinwald's back door.

With a little over a minute to go, it was an all-out Trinity-versus-Orion battle. Then, in one of the turns, Amezcua swung wide into the loose dirt and allowed Kinwald breathing room. Corl, though, was hunting Amezcua and looking for a place to pass as all three rocketed down the straightaway with 30 seconds left. At the start of the last lap, it was a tight race, but a last-turn pile-up put Kinwald and Amezcua over the finish line in that order; Corl got the short end of the stick, as Chad Phillips, Adam Drake, Greg Monise and Todd Hodge all finished ahead of him (in that order). Corl finished seventh, followed by Andy Smolnick and Trevor Adamo and early race retiree Greg Monise at the back.

Truck. At the front, it was Brian Kinwald on the pole with Greg Monise next to him. The first few laps saw a lot of position shuffling, but Kinwald's Trinity-powered Losi ride hung out in front with Travis Amezcua in second (all the way up from the eighth qualifying position), and in third was Chad Phillips, who was on the bubble spot at the start. As he pulled away to a straightaway lead, it looked like Kinwald's race, but his lead was quickly shortened and then taken away as Amezcua and his Orion-powered Losi Triple-XT cruised by. Chad Phillips was back in third, and Jason Corl followed closely in fourth.

With about a minute to go, the race was pretty intense. Kinwald was all over Amezcua's Triple-XT's motor plate, but he clipped a pipe and Amezcua soon had a straightaway's lead on the Dirtinator. And that's how they finished. Chad Phillips followed Kinwald and Corl was only a few seconds behind. Greg Monise, Ryan Cavalire, Robert Kuhl, Gene Hickerson, Wayne Rowee and Scott White finished in that order.

Four-Wheel-Drive. Despite the shortage of entrants, the race was exciting. Kinwald again qualified in the number-one position with Jason Corl right next to him—a flip-flop compared with the start of the Buggy Main. At the tone, Kinwald's Losi took off to a great start, but all eyes were on Travis Amezcua's Double-X4 as he launched from the eighth starting position right to the Dirtinator's rear bumper in a matter of seconds. Everyone expected the door-to-door battle we had seen in earlier Buggy and Truck Mains, and that's what we got.

Right behind Amezcua, Trever Adamo was also in the leading bunch, and that's how the beginning of the race was laid out. James Capelle followed that lead pack, and up front, Kinwald had a 3-second lead while Adamo was only 1 second behind Amezcua. Then Adamo really got down to business: he reeled in Amezcua and tried every line to get past. After that, it was difficult to keep track of the action; Adamo moved up into second followed by Amezcua and then Jason Corl managed to reel them both in. The Dirtinator, on the other hand, seemed to have checked out a huge lead with only 35 seconds to go. With about 20 seconds left, Corl got around Adamo, and it looked as if Kinwald would take the win. In the final turn on the last lap, Kinwald brought his car to a halt and waited for Corl to pass and win; then he hit the trigger and finished in second. Adamo brought his car over the line in third, and Amezcua was a close fourth. After running strongly throughout, James Capelle ran his rig across the line in fifth and was followed by Gene Hickerson, "Hacker," "Casper" and Wayne Rowee; Tunie Molina had a DNS.

WRAP-UP

I can't speak about previous Pro-Line Endless Summer Classics but I do know that in the year 2000, it was excellent. The MnM course was well laid out, and everything operated smoothly to give racers and spectators an enjoyable time; and that's what the sport is about.

LAND OF THE FREE ... STUFF

I don't know about you but I always enjoy attending events where the entry fee includes a handout motor. It levels the playing field and makes the racing that much more exciting.

And, hey; you get a new motor that lasts for many more races. At the Endless Summer Classic, the Intermediate drivers were given Reedy Rage handout motors, but it didn't stop there: Pro-Line handed out tires. Now, all Intermediate vehicles had the same power bolted to the tranny and the same meat for traction, so racing was more about driver skill than about who had the most power.

Congratulations to Frank Riley for his win in Intermediate Buggy and to Jake McCarvey for winning in Intermediate Truck.

M-N-M HOBBIES
RADIO CONTROLLED RACEWAY

The end of MnM?

As I walked through the pits, I heard racers referring to the event as "the End-of-MnM Classic"—sad but true. Just before the last race, we heard the announcer say that this famous venue would close its doors for good on the next day.

Owner Joe Stanovich has decided to move on, but there might be some good news on the way. The announcer also said potential investors might reopen the track. As we go to press, MnM is still closed but will hopefully reopen soon. Keep your eyes on "Racer News" for info.

INTERMEDIATE BUGGY

Fin.	Qual.	Driver	Vehicle	Motor	ESC	Transmitter	Battery	Tires	Gearing
1	1	Frank Riley	Losi	H	Novak	Airtronics	Peak	H	81/22
2	2	Hacker	Losi	A	Novak	Ko Propo	Integy	A	82/20
3	3	Bill Cook	–	N	–	–	–	N	–
4	4	Casper	Losi	D	Novak	Ko Propo	Integy	D	82/20
5	6	Jim Cooper	Losi	O	Novak	Hitec	–	O	82/20
6	10	Dana Timm	Losi	U	Tekin	Airtronics	–	U	84/22
7	8	Adam Smith	Associated	T	LRP	Airtronics	Reedy	T	81/21
8	9	Ryan Reese	Losi	–	LRP	Airtronics	Orion	–	82/19
DNS	7	Matt Leiniger	Associated	–	Novak	Airtronics	–	–	81/22
DNS	5	Mike Brown	Losi	–	Novak	Airtronics	Orion	–	82/23

INTERMEDIATE TRUCK

1	1	Jake McCarvey	Losi	H	Novak	Airtronics	Trinity	H	98/24
2	3	Robert Katnich	Losi	A	LRP	Airtronics	Peak	A	88/19
3	2	Hacker	Losi	N	Novak	Ko Propo	Integy	N	88/18
4	4	Bill Cook	–	D	–	–	–	D	–
5	9	Kyle Stallings	Losi	O	Novak	Airtronics	Integy	O	90/20
6	6	Sean Cahill	Associated	U	Tekin	Hitec	Pro-Match	U	90/17
7	5	Frank Riley	Losi	T	Novak	Airtronics	Peak	T	88/18
8	8	Ted Hayashida	Losi	–	Novak	Airtronics	Orion	–	88/17
9	7	Earl Valles	Associated	–	Novak	Airtronics	Trinity	–	87/17
10	10	Sean Cahill Jr.	Associated	–	Tekin	Airtronics	Pro-Match	–	87/16

BUGGY STOCK

1	1	Greg Monise	Losi	Orion	Tekin	Airtronics	Orion	Losi	82/21
2	3	Jeremy Hase	Losi	Trinity	Novak	Airtronics	Trinity	Losi	82/23
3	5	Jeremy Felles	Associated	Banzai	Novak	Airtronics	–	Pro-Line	81/22
4	7	Brent Newmam	Losi	Peak	Novak	Airtronics	Trinity	Losi	78/23
5	6	Jake McCarvey	Losi	Trinity	LRP	Airtronics	Trinity	Losi	92/28
6	9	Brandon Beckering	–	Banzai	–	–	World Class	–	82/21
7	10	Charlie Albeitter	Losi	Peak	Novak	–	Peak	–	–
8	8	Robert Kuhl	Losi	Banzai	Novak	Airtronics	World Class	Pro-Line	78/21
9	4	Andy Smolnick	Associated	Reedy	LRP	Airtronics	Reedy	Pro-Line	81/22
10	2	Geoff Monise	Losi	Orion	Tekin	Airtronics	Orion	Losi	82/22

TRUCK STOCK

1	1	Greg Hodapp	Losi	Peak	Novak	Airtronics	Peak	Losi	–
2	2	Jeff Guest	Losi	Team Jester	Novak	Airtronics	Team Jester	Losi	86/20
3	7	Eric Hase	Losi	Trinity	Novak	Airtronics	Trinity	Losi	88/19
4	5	Brandon Beckering	–	Banzai	–	–	World Class	–	88/20
5	6	Charlie Albitter	Losi	Peak	Novak	–	Peak	–	–
6	4	Robert Kuhl	–	Banzai	Novak	Airtronics	World Class	Losi	90/21
7	8	Brent Newman	Losi	Trinity	Tekin	Airtronics	Trinity	Losi	87/19
8	10	Jeremy Felles	Losi	Banzai	Novak	Airtronics	–	Losi	86/21
9	9	Trevor Clement	Losi	Peak	Novak	Hitec	Peak	Losi	88/19
10	2	Jake McCarvey	Losi	Trinity	Novak	Airtronics	Trinity	Losi	100/23

BUGGY MODIFIED

1	2	Brian Kinwald	Losi	Trinity	Novak	Airtronics	Trinity	Losi	92/25
2	7	Travis Amezcua	Losi	Orion	Novak	JR	Orion	Losi	78/20
3	5	Chad Phillips	Losi	Trinity	Novak	JR	Trinity	Losi	92/25
4	3	Adam Drake	Losi	Trinity	Novak	Airtronics	Trinity	Losi	92/27
5	6	Geoff Monise	Losi	Orion	Tekin	Airtronics	Orion	Losi	82/21
6	8	Todd Hodge	Losi	Trinity	Novak	Airtronics	Trinity	Losi	78/22
7	1	Jason Corl	Losi	Orion	LRP	Airtronics	Orion	Losi	78/22
8	9	Andy Smolnick	Associated	Reedy	LRP	Hitec	Reedy	Pro-Line	81/18
9	10	Trever Adamo	Losi	Trinity	Novak	Airtronics	Trinity	Losi	92/28
10	3	Greg Monise	Losi	Orion	Tekin	Airtronics	Orion	Losi	82/21

TRUCK MODIFIED

1	2	Travis Amezcua	Losi	Orion	Novak	JR	Orion	Losi	88/20
2	1	Brian Kinwald	Losi	Trinity	Novak	Airtronics	Trinity	Losi	100/19
3	6	Chad Phillips	Losi	Trinity	Novak	JR	Trinity	Losi	100/21
4	4	Jason Corl	Losi	Orion	LRP	Airtronics	Orion	Losi	88/19
5	3	Greg Monise	Losi	Orion	Tekin	Airtronics	Orion	Losi	82/21
6	7	Ryan Cavalire	Losi	Trinity	Novak	Airtronics	Trinity	Losi	88/21
7	8	Robert Kuhl	Losi	Banzai	Novak	Airtronics	World Class	Losi	88/18
8	5	Gene Hickerson	Losi	Peak	Tekin	–	Peak	Losi	87/15
9	9	Wayne Rowee	Losi	Banzai	Novak	Airtronics	Trinity	Losi	87/17
10	10	Scott White	Associated	Banzai	Novak	Airtronics	Pro Match	Pro-Line	84/21

FOUR-WHEEL DRIVE MODIFIED

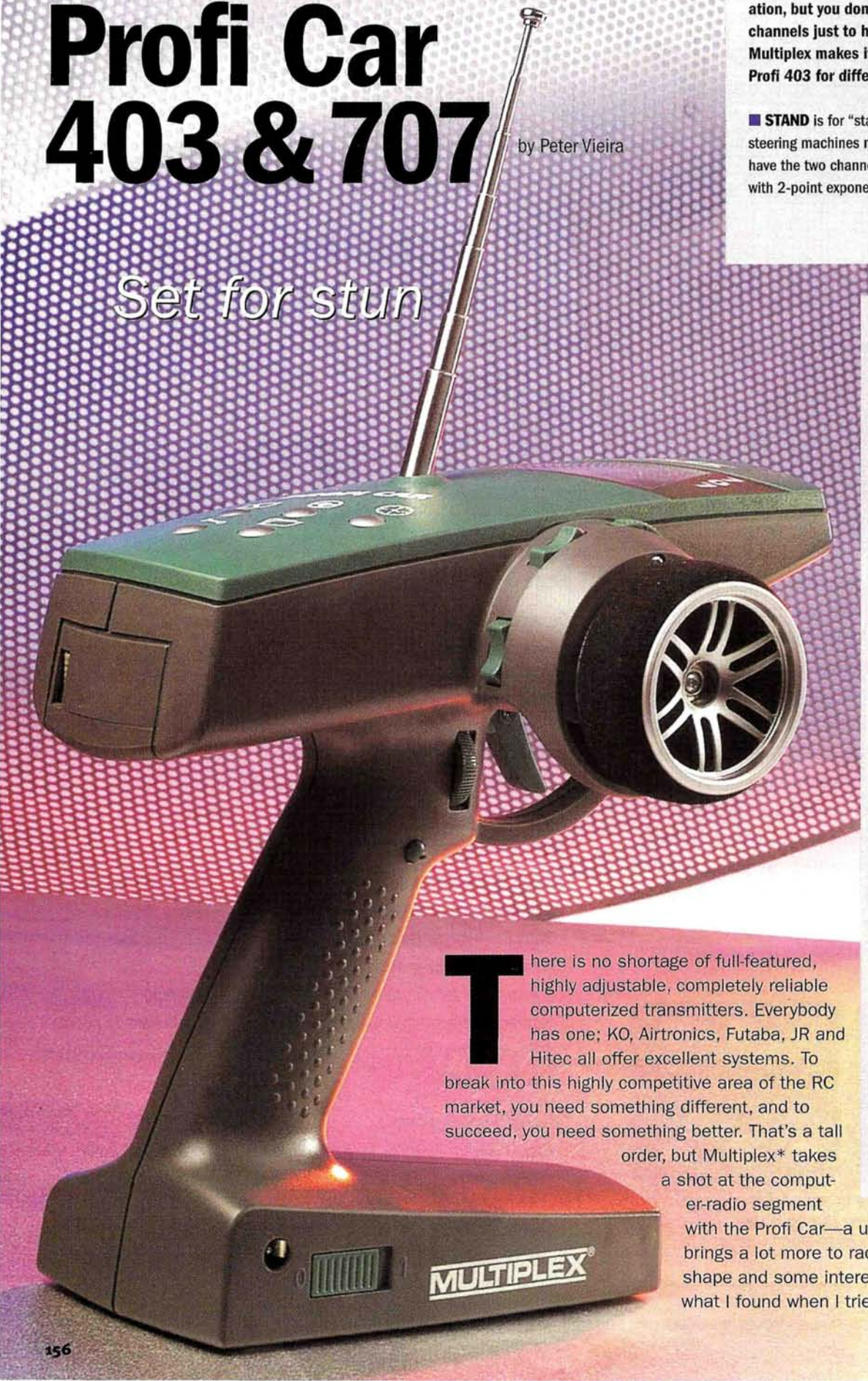
1	2	Jason Corl	Losi	Orion	LRP	Airtronics	Orion	Losi	86/19
2	1	Brian Kinwald	Losi	Trinity	Novak	Airtronics	Trinity	Losi	100/21
3	3	Trever Adamo	Losi	Trinity	Novak	Airtronics	Trinity	Losi	100/23
4	4	Travis Amezcua	Losi	Orion	Novak	JR	Orion	Losi	86/18
5	6	James Capelle	Losi	Trinity	Novak	Airtronics	Trinity	Losi	84/17
6	5	Gene Hickerson	Losi	Peak	Tekin	–	Peak	Losi	84/18
7	7	Hacker	Losi	Peak	Novak	Ko Propo	Integy	Losi	84/18
8	8	Casper	Losi	Peak	Novak	Ko Propo	Integy	Losi	84/19
9	9	Wayne Rowee	Losi	Banzai	Novak	Airtronics	Trinity	Losi	86/17
10	10	Tunie Molina	Losi	Orion	Novak	Airtronics	World Class	Losi	84/18

"–" means driver did not supply information ■

Multiplex Profi Car 403 & 707

by Peter Vieira

Set for stun



There is no shortage of full-featured, highly adjustable, completely reliable computerized transmitters. Everybody has one: KO, Airtronics, Futaba, JR and Hitec all offer excellent systems. To break into this highly competitive area of the RC market, you need something different, and to succeed, you need something better. That's a tall order, but Multiplex* takes a shot at the computer-radio segment with the Profi Car—a unique transmitter that brings a lot more to radio design than a futuristic shape and some interesting color choices. Here's what I found when I tried out the Profi Car.

CHANNEL SURFING

The Mutilplex Profi Car is available in two models: 403 and 707. Both feature 7-channel operation, but you don't have to wade through all seven channels just to hook up your 2-channel car. Multiplex makes it simple by programming the Profi 403 for different vehicle types. For example:

■ **STAND** is for "standard" cars—the basic throttle-and-steering machines most of us drive. In this mode, you have the two channels plus a switched third channel with 2-point exponential (expo) on the throttle.

Operating the Profi Car

Although the Profi Car is the most unique-looking transmitter on the market, it's still relatively basic in terms of control layout. There's a wheel and a trigger, of course, and digital trim knobs around the wheel pylon. A single dial and button are on the grip, and the LCD display and menu icons are on top of the radio. The menu icons are the best feature; instead of the "system" and "direct" modes of most other computer radios, the Profi's graphic symbols make it obvious which button to press for the functions you need. The steering-wheel icon accesses all steering features; the trigger icon brings up throttle options; the stopwatch symbol handles the timing modes; the "folder" button stores/erases/names files in the 12-model memory; and the "wrench" button gets you to the settings for sound on/off, deadband, display text and other functions that are typically set once and used for all models.

Once you're at the screen you need, the grip dial adjusts the value, and then the grip button locks it in. That's about it. In addition to the alphanumeric display, bar graphs indicate trim positions—in all, a very simple radio to use (after a pass through the manual).

■ **2 + 1 CH** is for engine-powered cars. In this mode, the 5-point throttle-curve function is activated (see "Software Features"), and the switched third channel is also available.

■ **2 + 5 CH** opens up all seven channels, with 2-point throttle expo and switched operation of channels 3 through 7. For scale projects with operating headlights, taillights, turn signals, tilt beds, sound systems, etc., the Profi gives you all the channel power you need without having to resort to a stick radio.

The Profi Car 707 gives you a two additional vehicle types, both of which are ideal for 1/5- and 1/4-scale models. Here's how they work:

■ **4 CH** mode dedicates channels 1 and 4 to steering (for use in large vehicles that require two steering servos), uses channel 2 for throttle/brake, and operates another brake with channel 3. In addition, the 5-point throttle curve is activated. This setup allows you to hold the car with the third-channel brake via a grip button while you blip the throttle with the trigger.

■ **5 CH** dedicates channels 1 and 5 to steering, uses channel 2 for throttle only and operates the brake with channels 3 and 4. Again, the 5-point throttle curve is activated. This mode is useful for vehicles with independent front and rear braking systems, as it allows you to adjust the brake bias from the transmitter.

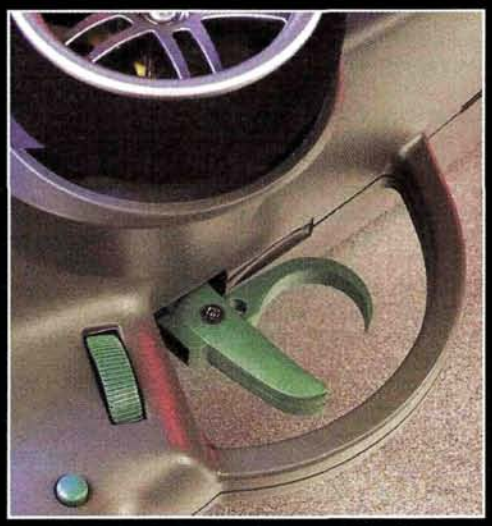
In addition to the noted vehicle-type modes, the 707 offers advanced braking system (ABS) and traction control (TC) functions. Traction control works like the steering speed function but is used to slow the throttle servo, and it functions only when you open the throttle. ABS is essentially an anti-lock system, and like full-scale cars' ABS, the Profi's system pulses the brake to prevent it from locking up. There's a unique twist, though: you can set the ABS to be off unless the steering servo has moved to a certain point that you select; by doing that, you can save the ABS for those tight situations where a spinout is likely, yet you can preserve full wheel-locking power for other portions of the track.

TESTING

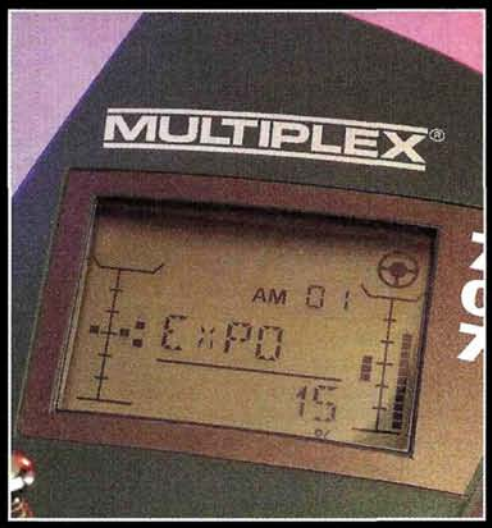
To test all the Profi's functions, I plugged in a pair of servos and simply watched the servo horns to make certain the radio was doing what the manual said it could do. Believe me, it took a while to try out all the functions, but I'm pleased to say everything worked as promised. I highly recommend you do the same thing when you buy any computer radio; no matter how good the manual is, it's always easier to understand the various functions when you can see the servos moving.

To field-test the Profi, I matched it up with an FM KO Propo receiver in a Team Losi Triple-XT, and an Airtronics AM receiver in a Tamiya TL-01 (you can use any negative-shift receiver with the Profi; that's every receiver out there, except Futaba and Hitec or those designed for use with Hitec and Futaba systems). I used the required Multiplex-brand transmitter crystal and the appropriate manufacturer's receiver crystal in each car. Although most of us have long since passed the "Let's see how far away we can drive it" stage, this seems to be a popular test of any transmitter's "strength." In both AM and FM modes, the Profi kept my cars in full control until they were so far away that I had trouble determining whether they were coming or going.

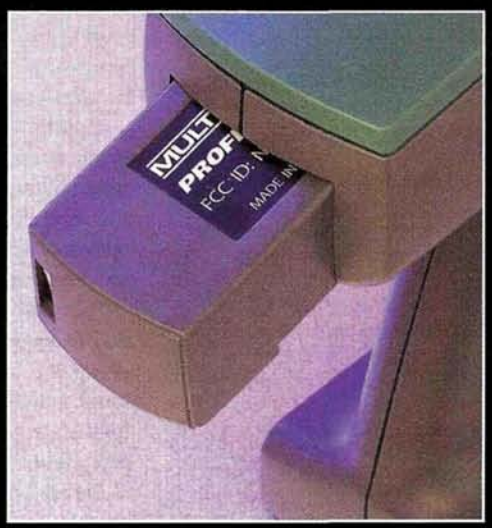
To get a sense of comfort and "feel," I passed the Profi around to the other *RC Car Action* editors (along with a KO Mars, JR R-1, Airtronics M8 and Futaba 3PDF). All agreed that the Profi's grip has a smooth, natural feel and is noticeably lighter, thanks to its 6-cell Ni-Cd pack, which is much less hefty than the 8AAs used in other radios (if you're curious, the Profi weighs in at 564 grams, while the 3PDF, Mars, R-1 and M8 weigh 641, 714, 891 and 837 grams "fully loaded," respectively). Trigger and wheel action were on a par with the other transmitters, but the Profi's tightly curved, adjustable brake trigger was uncomfortable to operate, even when fully extended. For greater comfort, I customized the brake trigger by heating and reshaping it.



The grip dial adjusts steering rate while driving and selects the value for the Profi Car's various functions when setting up the system. The grip button locks in the settings and has other functions depending on the way you program the radio.



The Profi's screen is easy to understand. The wheel icon indicates a steering function, which is clearly spelled out—15% expo. The screen also shows the modulation setting (AM), as well as the throttle and steering trim positions and steering rate settings (the bar graphs on the sides of the screen).



The Profi's module slides out easily. A crystal is included but a receiver is not—or, at least, not yet. Multiplex will soon offer the Profi transmitters with a receiver.

The button icons make it easy to get to the functions you need. Can you guess which button to press for steering-related settings? Hint: it isn't the wrench.

SOFTWARE FEATURES

Like other computer radios, the Profi 403 and 707 have a staggering array of adjustments and settings. To make it easier to understand those features, I've listed them by their common names and put the actual name shown on the transmitter display in parentheses. Believe it or not, the features listed here are just the "broad strokes"; many features have additional flexibility and are fully covered in the manual.

■ **Throttle/brake exponential (T-CURV).** The T-CURV settings also permit adjustment of the minimum throttle position, referred to as "initial throttle" (IT), maximum throttle position (full throttle, FT) and idle position (IDL), as well as the exponential setting. Exponential is adjustable independently for brake throw (BRAKE 1) and throttle throw between the "initial throttle" and "full throttle" positions (EXPO). You can also select a 5-point throttle-curve option in addition to the usual percentage values. The 5-point curve lets you tailor the throttle-servo response to the powerband of your car's motor or engine, and this will help fatten up flat spots or reduce peakiness.

■ **Partial-throttle start (START).** This lets you set the throttle channel to deliver a preset amount of throttle as soon as you move the trigger out of the deadband. For example, if you set the START function for 50 percent, the throttle servo or ESC will jump to half throttle as soon as you touch the trigger. When you move the trigger past the set throttle position or return the trigger to neutral, the throttle channel returns to normal operation.

■ **Steering trim (CENTRE).** This is an easy one; it's used to center the servo.

■ **Total steering travel (TRAVEL).** This function sets maximum servo throw—as you may have guessed.

■ **Auto dual rates (DUAL).** By using this function, you can set the amount of steering throw to increase or decrease with throttle position; for example, you can set the radio to provide more steering at low throttle for technical sections of the track and dial out steering at maximum throttle to reduce the chances of over-controlling the car.

■ **Steering servo speed (SLOW).** You can set servo speed independently for the swing away from neutral and the return to neutral. This is handy if you want to reduce responsiveness when you exit a turn (returning the steering to neutral) but you want maximum servo speed when you enter a turn (moving the steering away from neutral)—or vice versa.

■ **Steering exponential (EXPO).** This adjusts the responsiveness of the steering servo around neutral. Setting a negative exponential value will cause the servo to move less in response to a given input from the wheel, while a positive value causes it to move more. As the wheel is turned further from neutral, servo travel more closely matches wheel travel.

■ **Stopwatch/timer (T-MODE).** This mode includes a variety of functions: radio "on" time (OPTIME—useful for estimating battery life), nominal lap time (T-NOM—allows you to preset a target lap time, which the radio uses to beep confirmation when you meet or beat the time or run a longer lap) and a countdown timer (DURA—can be set to tick off any number of laps or count down from a preset time).

■ **Trigger deadband (DEADB).** This adjusts the trigger travel required to activate the throttle servo, so you can set up the transmitter with a "hair trigger" or with a more forgiving setting for twitchy fingers.

■ **Modulation type (AM-FM).** Yes, you guessed right; you can switch the Profi radios between AM and FM modulation. Pretty cool.

■ **Endpoints (S-TRAV).** The endpoint settings can be set independently for left and right travel—usually to suit steering systems with unequal throw, but it's occasionally used to dial in a car for a track with more right than left turns (or vice versa).

■ **Trim rate (STEP).** The STEP function adjusts how far the servo's output horn moves in response to a single increment of trim adjustment.

■ **Owner's name (NAME).** That's you, buddy.

■ **Display language (TEXT).** English, German, French, Italian, Spanish .... If you speak it, so does the Profi.

■ **Adjustable low-voltage alarm (ALARM).** This is a nice feature. You decide how low the voltage needs to go before the low-battery alarm sounds.

■ **Button tone on/off (SOUND).** Another nice touch. If you don't want to hear a "peep" every time you press a button, use SOUND to turn the tones off.

■ **Model memory.** The Profi 403 stores up to six transmitter setups, and the 707 can handle 12. For infinite model memory, Multiplex offers a PC interface that allows you to store, edit, upload and download as many setups as you like, and it provides a graphic display for exponential and other settings.

Mutiplex breaks away from the 8-cell, 9.6 volt standard with a 6-cell, 7.2V pack. This cuts down on the weight of the loaded transmitter but does not diminish signal strength, according to Multiplex. Based on our testing, we came to the same conclusion.

Pick your Profi

The Profi Car 403 and 707 can be purchased separately with Ni-Cd battery packs, or as part of Grand Prix sets with servos and other electronic gear. Here are the particulars:

- Profi Car 403, transmitter with Ni-Cds: $175
- Profi Car 707, transmitter with Ni-Cds: $275
- Profi Car 707, transmitter with Ni-Cds and IPD receiver: $325

Profi Car 403 Grand Prix sets

- Grand Prix electric set includes transmitter with Ni-Cds, IPD receiver, servo and ESC: $325
- Grand Prix nitro set includes transmitter with Ni-Cds, IPD receiver, receiver Ni-Cd,and two servos: $350

Profi Car 707 Grand Prix set

- Profi Car 707 Grand Prix set for 1/5-scale cars includes transmitter with Ni-Cds, IPD receiver, receiver Ni-Cd, PC interface, Jumbo Speed and Power Speed servos: $550

THE VERDICT

Likes

- Massive inventory of adjustable features.
- Easy-to-use software.
- Operates with both AM and FM receivers.
- Lightweight and comfortable.

Dislikes

- Brake trigger is a bit "pinchy."
- A receiver is not included.

If you're like most high-end computer-radio users, you probably won't use many of the Profi's more esoteric functions and will instead reach for the endpoints, exponential and trim settings most often. Though all the Profi's other functions do work as promised, for most racers, the radio's main benefit is the easy accessibility of those often-used functions and the no-nonsense way they are adjusted.

The radio's versatility is another bonus; it's nice to be able to switch from AM to FM modulation, and this flexibility allows you to operate your AM-equipped play cars from the same radio as you use for your racing stuff. If you're into large-scale gas racing, the Profi Car 707's "vehicle-type" settings can make car setup much simpler.

Simply put, Multiplex's Profi Car transmitters are highly capable and reliable and represent another good choice in the competitive computer-radio market. If you're in that market, before you buy, get your hands around a Profi Car's grip; it's definitely worth a test-grab before you make your decision.

** Addresses are listed alphabetically in "Featured Manufacturers" on page 216.* ■

HOW TO

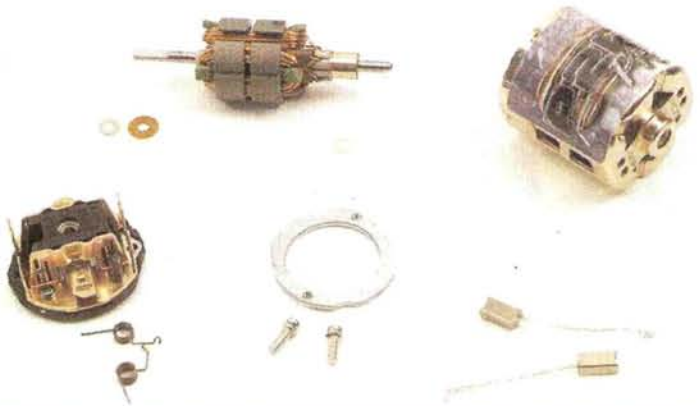
Dial-in your Rebuildable Stock Motor

Trinity's Jim Dieter shows you how

by Kevin Hetmanski

Now that rebuildable stock motors have become the standard for stock-class racers, it's more important than ever to know how to dial in your motor for maximum performance. Just about all of the tricks the mod-motor guys have used for years can now legally be used with stock motors, and none of them require any special skills—just a little time. For the skinny on stock-motor tuning, we turned to Trinity's motor master, Jim Dieter. Here's how Jim makes a stock motor scream!

To disassemble a motor, you'll need only a Phillips-head screwdriver and the items shown here. It's *that* easy to give your motor the Dieter treatment.



To tune a motor, you first have to disassemble it. If you've never had the chance to see what's inside an electric motor, here you go.

1 Disassemble the motor

Remember to remove the brushes before you pull the endbell off. Remove the phenolic washer and shims from the armature, and make certain there aren't any shims left inside the can or endbell.

JIM DIETER *"It may seem strange to tear down a new motor before you run it, but the idea is to make it even better than new. If you want to win races, it's all part of the game."*

2 Seat the bushings

The bronze bushings in the armature and endbell must be completely seated so their bores are perfectly in line with each other. If they aren't, the armature will bind in the bushings, and the motor will not achieve maximum rpm. Place the endbell and can on a sturdy, hard surface, and use a hammer and a section of dowel that has the same diameter as the bushing (or is just slightly smaller) to tap the bushing into place. A couple of relatively gentle taps will be enough to seat the bushing if it is not already fully seated.

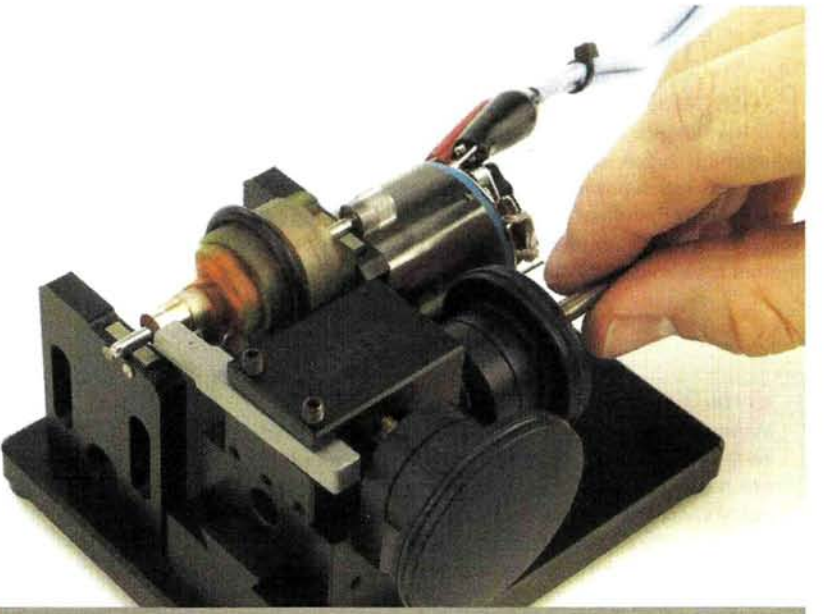
You can press the bushings into the endbell or motor can with a wooden dowel. A light tap or two will seat the bushings in the motor and will ensure that they sit flat.

JD *"Generally, the bushings are correctly installed at the factory, but this step is worth doing 'just in case.' If the bushings are at all misaligned, it will affect a motor's efficiency and power."*

3 Cut the comm

You'll need a motor lathe for this step, but don't worry if you don't have one; someone at the track who has one is bound to be willing to cut your comm for a soda or a slice of pizza, or your hobby shop may offer comm-cutting as a service. If you do have a lathe, just skim the comm to true it; try to reduce its diameter as little as possible so that you'll get maximum wear from your motor. If you have a "Pro" motor, this step has already been done for you at the factory.

JD *"When the comm segments are pressed onto the armature at the factory, they bow slightly. The skim cut ensures a perfectly true comm, and that reduces the likelihood of brush bounce and guarantees that the brushes will have the best possible contact. I usually coat the comm with black marker so I can see any 'high spots' still left after the first pass. I make the next pass only just deep enough to get rid of the high spots, so I keep as much of the comm material as I can."*



A quick turn on a lathe will ensure that your commutator is perfectly true. Trinity's new Tru Lathe 3 is pictured; look for a review in a future issue.

The number of shims required on each end of the armature varies with the motor. Determining how many shims to install can be tedious, but it's well worth the time.

JD *"If the armature has no shims on the nose bushing side but you need the armature to sit lower in the can, you can shave the nylon off the armature shaft with your motor lathe. Remove as little material as necessary. When you reassemble the motor, try using Trinity's Teflon shims (part no. 4030) in place of steel shims where the shims contact the bushings. Friction is the enemy, and the Teflon shims are another way to fight friction."*

4 Center the armature in the can

It's important for the armature to be centered in the magnets' magnetic field; if it isn't, your motor won't be as powerful or as efficient as it could be. To align the armature, reassemble the motor without armature shims or spacers, and leave the brushes out. Spin the armature; it will center itself. Pull the armature shaft out of the can's nose, and note how much play there is. Remove the armature, add shims to take up the play, and repeat the process until there is just the slightest free play when you pull on the armature shaft after centering it by spinning it in the can. Then add shims to the commutator side of the armature until there is just a tick of play when you push on the armature shaft; if there's no play, the arm is pressing against the bushings, and that causes friction. Make sure you can feel just a tick of play! If you need extra shims, buy Trinity's shim kit (part no. 4027)

5 Align the brush hoods

The "hood" is the part of the endbell that the brushes slide into. To align the hoods, you'll need a special tool; Parma PSE* makes a nice one. First loosen the brush eyelet screws and the spring posts. You can avoid scarring the posts with pliers by using Trinity's 4528 spring-post wrench. If you use the PSE tool, just fit it over the hoods and then retighten the endbell hardware. To use the Trinity tool, you'll have to remove the endbell from the motor and slide the brushes out of the hoods. Loosen the endbell hardware, slide the tool through the hoods, then retighten everything. Properly aligned hoods offer two benefits: first, the brushes will make maximum contact with the commutator; second, the brushes will be correctly positioned relative to the magnets. Both are important for maximum power and efficiency.

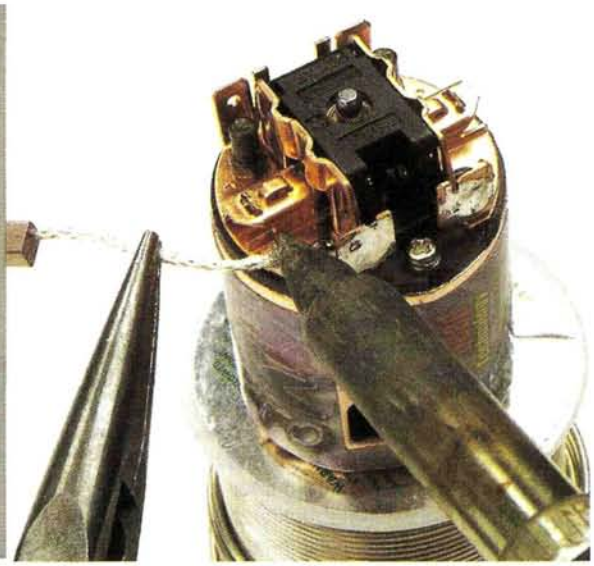
JD *"Like the bushings, the hoods are probably OK when they come from the factory, but it's best to check them to be sure. The P2K's brush hoods have small dimples that fit into the endbell to ensure correct alignment, but it never hurts to manually check the hoods. Stock-motor tuning is all about finding the numerous little tweaks that make a real difference when you add them together. Properly aligned brush hoods and bushings are a must."*

Use a brush-hood alignment tool such as this one from Parma/PSE to align the hoods.

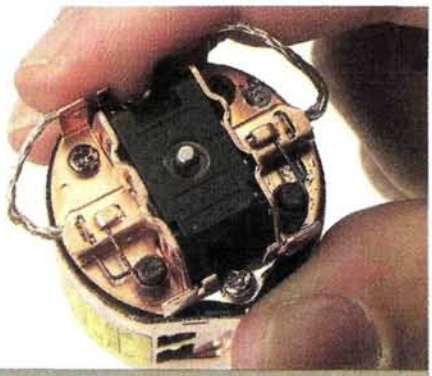
6 Replace the stock brushes

The full-face brushes included with most stock motors take time to break in, and they don't allow the motor to develop as much power as it's capable of. Jim recommends the Trinity E-brush (part no. 4499) and suggests that you solder the brush shunts directly to the endbell's tabs. "Pro" motors have soldered E-brushes from the factory.

JD *"The E-brush has more silver in it, and that increases its conductivity for greater power; its serrated face also breaks in more quickly. If you solder the brush shunts, be careful not to overdo it with the solder; you don't want to saturate the shunt and make it inflexible. Use a good iron that gets very hot, so you can attach the brush quickly with less chance of solder traveling up the shunt."*



You can skip this step if you prefer the convenience of screw-on brushes with eyelets, but for the absolute lowest electrical resistance, soldering the brush shunts to the endbell tabs is best.



Here, Trinity's "heavy" red/purple spring combination is installed for maximum torque—a good short-track setup.

7 Spring tuning

By installing brush springs of different rates, you can tune the strength of the brushes' pressure against the comm. There isn't any trick to installing the brushes; it's the spring rate you choose that matters.

JD *"When I'm setting up a motor for sedan or off-road racing, I replace the stock brush springs with Trinity 11-ounce red springs. The heavier tension gives more low-end power, which is important for the heavier vehicles in these classes. In 1/12 scale and other cases in which you need higher peak rpm, I use a lighter spring such as blue [7-ounce] or green [9-ounce]. The lighter springs press the brushes against the comm with less force, so friction is reduced and rpm is increased."*

8 Break-in

Now that the motor is completely aligned and trued up, it's time to break in the brushes and bushings. Place the motor shaft in a drill or rotary tool, apply a drop of Trinity Bushing Buster to each bushing, and spin the armature at low rpm for a few minutes; that's all there is to it. After break-in, clean the motor with motor spray to remove the cutting oil and any bushing particles, then put a few drops of bearing oil on the bushings before you run the motor.

JD *"The Bushing Buster compound contains abrasive particles that speed up break-in. It's very effective at freeing up new, 'tight' bushings, but you shouldn't use it after the bushings have been broken in. If you overdo it, the bushings will get sloppy, and in extreme cases, the armature may buzz in the bushings at high rpm. After break-in, just use light oil on the bushings; I like Trinity Zero G oil."*

It isn't difficult to break in your motor bushings: put the motor's output shaft in a drill or Moto-Tool, and spin the armature for a few minutes. Trinity makes a special bushing-cutting fluid that will help you to break in the bushings faster.

NOW GO RACE!

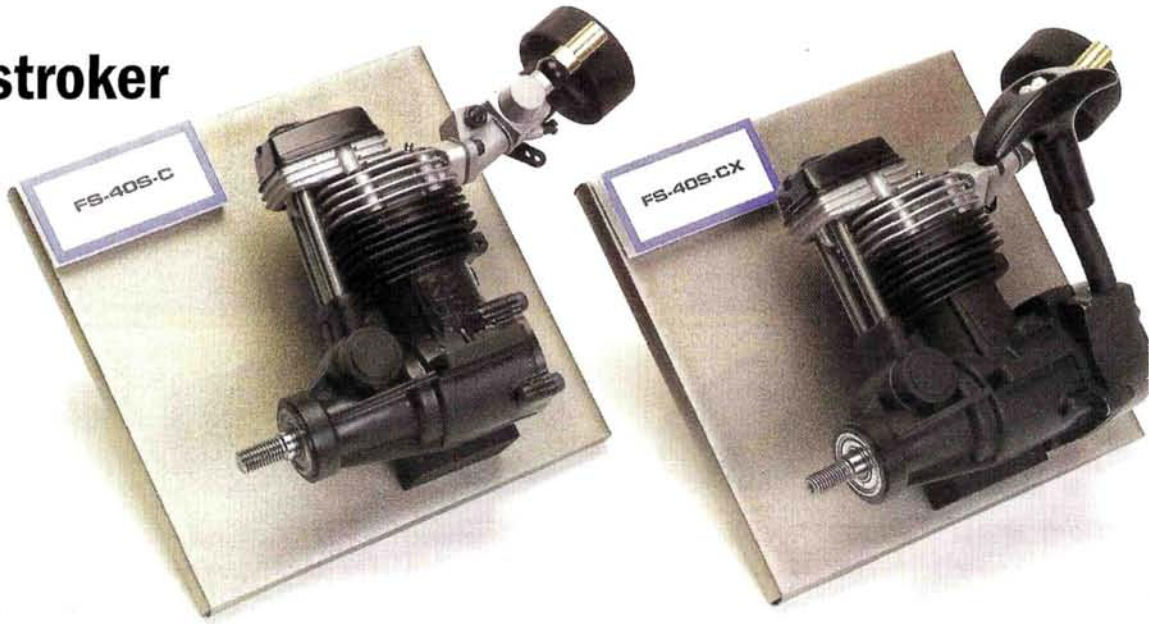
Are you surprised it was that easy? It really doesn't take much time or money to give your stock motor an edge, so there's no excuse not to do it. If you don't follow these tips, your competition will! Special thanks to Jim Dieter for the inside info, and good luck to all on Sunday.

**Addresses are listed alphabetically in "Featured Manufacturers" on page 216.* ■

BY CHRIS CHIANELLI

Big-block 4-stroker

Do I have a hot item for you this month! It's O.S.'s* new .40 displacement 4-stroke engine that was specifically designed for 4WD 1/8-scale, off-road use where on-demand high torque can be put to good use. Rumor has it that Kyosho will offer a 4-stroke Fit Kit for the LandMax Rally Series. This means that other Kyosho 1/8-scale buggies and the USA-1 Monster Truck should be able to accept this new 4-stroker with no problem. A monster crusher growling with big-bore 4-stroke power under the hood; now you're playin' my song.



This new 4-stroke .40 will be offered in both pull-start and non-pull-start versions. Information on horsepower, torque and rpm operating ranges is not yet available.

With its smooth, broad power band, in an 1/8-scale buggy—with proper gearing, keep in mind—this engine could kick serious you-know-what on many off-road tracks; a high-speed oval track, no. That's where the peak horsepower of the 2-stroke screamer will shine. But a gutsy 4-stroke, with its mid- and upper mid-range pulling power, will gobble up the twisting topography found on typical off-road courses like "Homer"

With the backplate removed, you can see the very beefy connecting rod; it has to be robust to handle the high torque stresses. Its lower and upper ends have oil holes and are fitted with phosphor-bronze bushings. Somewhat surprising (to me), is the two-piece crankshaft, since a hollow shaft is not needed for induction purposes (in a 2-stroke, it is). Note the predrilled and tapped pressure-fitting site in the backplate—perfect for the addition of a Conley* fuel-pump system.

The front ball bearing is sealed to keep out dust and dirt. Like the .26, the .40 will most likely require a heavier special flywheel; the shaft comes cut for this.

With the camshaft housing endcap removed, you can see the pushrod cam follower on the exhaust-side cam lobe. The cam gear is driven off a gear that's cut into the crankshaft. Note the ball bearing fitted into the housing cap. The cam is also supported by a ball bearing at the other end.

With the rocker-arm cover removed, valve-clearance adjustments are easy to make. Again, like the .26, production versions of the .40 will most likely be fitted with high-tension, high-rpm intake- and exhaust-valve return springs.

Left: though slightly different in appearance, the .40's carburetor is of the same design as the .26's, but it has a larger venturi bore; neither carb has any low-end adjustment whatsoever. At this time, I simply can't explain why they work so well without a low-end needle, but they do. The rotary throttle barrel ismachined from brass, which I really like. I do not like the plastic fuel-inlet banjo; in my humble opinion, this thing should be a machined-aluminum unit with a gasket.

Right: the O-ring fits into the bottom of the intake manifold (center), and the tapered end of the carburetor's neck squeezes into the O-ring—a very good, and tightly sealed, way to do things. The gasket on the left is made of a thick, composite material that isolates the carburetor from the higher head temperatures associated with a 4-stroke.

Hetmanski at an all-you-can-eat-free-in-4-minutes special at the local Fat 'n' Juicy Burger joint. Seriously, because it is so new on the car scene, the 4-stroke's true potential has yet to be realized.

Trust me, I'll be putting one of these new "torque animals" in a 4WD 1/8-scale car as soon as I can, and you'll be reading about it here.

Addresses are listed alphabetically in "Featured Manufacturers" on page 216. ■

TECH Q & A

Pumping fuel. What does it really do?

Q I have enjoyed your columns in "Car Action" for five years now, especially "Back Lot." Now that I have my first nitro car (or truck, I should say), I have taken a liking to "Piston Power," as well.

I have a few short questions. The first is on the Conley fuel pump featured in the November issue. Maybe I am just a month ahead, but what kind of other gains come with installing a fuel pump on a nitro engine (besides that the fuel is pushed instead of sucked)? Do you get a more consistent engine performance, tank to tank? Do you get more top end and torque? I can't see parting with my cash for a decoration.

My second question concerns a subject not heard much about for some reason, but how do you port and polish a 2-stroke nitro engine? I understand what is done on a 4-stroke full-size engine (I'm an ASE mechanic), but nobody ever mentions an RC port/polish except once in a blue moon. Do you need any special tools, or can it be done with a Dremel and patience?

Last but not least: what happened to the 4-stroke nitro engines that were all the buzz a few months ago? I would consider bolting one to my T-Maxx if I could get some feedback—pros and cons and whether it would be worth it.

Your time is greatly appreciated, oh, great king of everything that is nitro.

[email]

Jason Haggerty
Bonner Springs, KS

A "King of everything"? See, fellas? Jason knows how to get his letter answered! Seriously, "Chris" will do just fine.

Regarding your fuel-pump question: at this point, I can tell you what I know it will do—and what I believe it will. I can tell you for sure that the Conley system is far from "decorative."

Yes, Jason, consistency is the big plus here. Supplying a fixed positive fuel pressure to the spraybar will definitely make needle-valve settings universally more constant—not only from tank to tank but, more important, from a full tank to an almost empty tank. An engine's setting will lean out slightly as the tank is emptied. This is because, without a fuel pump, while the engine's negative pressure (the sucking force) remains constant at any given rpm setting, the relationship between the fuel level in the tank and the carburetor's spraybar is in a constant state of flux. Remember, all fluids have level-seeking (level-sensitive) properties. As the fuel level in the tank goes down in relation to the carburetor's spraybar, the mixture automatically leans. Now, when we add a positive fuel-delivery system to the picture, this variable disappears. Settings become more stable, so engine dependability increases. And, in addition, automatic self-leaning, which has ruined many engines on hot humid days, becomes far less of a worry.

> With a pump system, the fuel is ready and waiting at the spraybar with a positive pressure behind it—kind of like being at a starting gate—for when the engine needs it.

Concerning other benefits of a positive fuel-delivery system: I'm sure a fuel pump improves throttle response. With a pump system, the fuel is ready and waiting at the spraybar with a positive pressure behind it—kind of like being at a starting gate—for when the engine needs it. Without a pump, under acceleration, the engine must build up the needed negative pressure to suck in the fuel necessary to supply the increasing rpm. There is an inherent lag, slight though it may be, associated with this process.

As for fuel pumps increasing top end, the jury is still out on that as far as I'm concerned. The benefit of a reliable needle setting and improved throttle response, however, is every bit as important as top end—probably more so, in my opinion. I do intend to use the Conley system more, so stay in touch.

Don't go sticking high-speed Dremel tips into your ports. Polished ports have proved to do very little with car racing, or Formula One aircraft racing for that matter. A glass-bead (roughened) surface, on the other hand, does seem to help keep the mixture better atomized as it moves through the ports; but leave stuff like that to guys like Ron Paris.

This installment of "Piston Power" should be an answer to the last part of your question. Seeing whether 4-strokes in RC cars will catch on or not will take time. The associated higher cost of 4-strokes will cause further caution. I have high hopes for the future of the 4-stroke in cars. I feel it could do well in both sport running and racing as long as proper support equipment, such as correct gearing options, is made available. *CC*

Send your nitro-related letters to Chrisc@airage.com, or "Piston Power," *RC Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606 USA.

Dynamite **Vision Peak Charger**

Are there enough easy-to-operate AC/DC peak chargers on the market? In my opinion, there can't be enough. Everyone needs a reliable peak charger; it just makes electric-powered RC that much easier, and that means more fun. Dynamite's* Vision Peak is the latest push-button peak-charger, and it brings a few unique features to the pit table.

FEATURES

• **LED charge-level indicators.** Four LEDs indicate charge level: 0 to 25 percent, 26 to 50 percent, 51 to 75 percent and 76 to 100 percent. A fifth LED labeled "Full charge" blinks when the battery's voltage has peaked.

• **AC/DC operation.** The Vision Peak includes jumper-cable-style clips with a 5-foot AC cord and 3½-foot DC leads.

• **30-second boost charge.** This is not a re-peak function; according to Dynamite, the boost charge is meant to "... give your battery pack an additional voltage boost" after an extended trickle-charge. The function works only if the start button is pressed when the charger is in trickle-charge mode and the battery has not yet been disconnected. If the pack is disconnected and then reconnected, the Vision will re-peak the pack when the start button is pressed.

• **2 or 4A charge rate.** The start button is also used to select the amp rate. You can choose 2 or 4 amps, but nowhere in between.

• **Trickle-charge.** The Vision kicks down to a low-amp trickle charge after the pack's voltage has peaked.

• **Voltmeter jacks.** This is useful to monitor pack performance. Just plug your digital voltmeter into the jacks to monitor charge voltage.

• **6- or 7-cell compatibility, push-button operation.** A switch selects 6- or 7-cell operation, and a single button starts the charging and selects the amp rate. To stop a charge, you must disconnect the pack.

• **5-year warranty.** We rarely see such long-term support for an electrical product, so Dynamite must really believe in the Vision. Any defects in materials and manufacturing are covered—as long as you don't modify the unit.

• **Fuse protection.** If you overload the charger or short the charge leads, the fuse will pop, but there's a replacement right there.

OPERATION

It doesn't get much simpler than this: just plug in the pack (the Vision Pack accepts female Tamiya plugs, and an adapter is included for packs with a male Tamiya connector), flip the cell selector switch to 6 or 7 cells, then press "Start." The LEDs wink reassuringly as the Vision feeds juice into the pack, and as it reaches each charge "plateau," the appropriate LED glows steadily. Full peak is indicated when the full-charge LED blinks and the four charge-level LEDs glow steadily. If all five LEDs are blinking, the battery has accepted over 1.75 volts per cell without peaking (don't blame the charger; your pack is ready for retirement), and the Vision has automatically shut down for safety.

TESTING

I charged 6- and 7-cell Ni-Cd packs of various ages and capacities without having any false peaking. After several back-to-back charges, the Vision was hot but still comfortable to hold.

All the packs came off the charger slightly warm, and that indicates a good peak charge. The unit's instructions don't tell us whether it's compatible with nickel-metal-hydride (NiMH) cells, so I called for the official story. A company spokesperson said that the Vision isn't recommended for NiMH packs, but I charged a few anyway. The Vision easily peaked the packs, but it put in slightly too much juice, and after being charged, they were closer to hot than warm. Dynamite's tech guys confirmed that the Vision looks for a 9- to 12-millivolt drop to indicate a peak charge, and that's fine for Ni-Cds but generally too high for NiMHs. In a pinch, you could charge NiMHs on the Vision, but be sure to monitor them, and disconnect them when they get warm. And remember that the Vision will trickle automatically after peaking, and NiMH cells won't like that. Remove the pack as soon as it has peaked! Ni-Cd packs are another story: they don't mind a trickle-charge.

To test the boost charge function, which delivers a 4A, 30-second charge to "revive" trickled cells, I allowed a pair of 1700mAh packs to trickle-charge overnight. Then I boosted one pack to see whether I'd detect a difference in the packs' performance. The boosted pack's voltage was higher, and it felt punchier on the first trigger pull. One launch burned off that punchy feel, however, and the pack behaved exactly like the un-boosted battery for the rest of its run.

SPECIFICATIONS

Input	110V AC/12V DC
Compatible with	6- and 7-cell Ni-Cd packs w/Tamiya connector
Charge amperage	2 or 4 (selectable)
Voltage threshold	9 to 12 millivolts
Part no.	DYN4045
List/street prices	$59.95/$39.95

Likes

- Reliable: no false peaks.
- Easy to use.
- Charge-time LEDs ease the "When's my pack gonna be ready?" anxiety.

Dislikes

- To charge packs without a Tamiya connector, an adapter or alligator-clip setup must be constructed.
- Not recommended for charging NiMH packs.

THE VERDICT

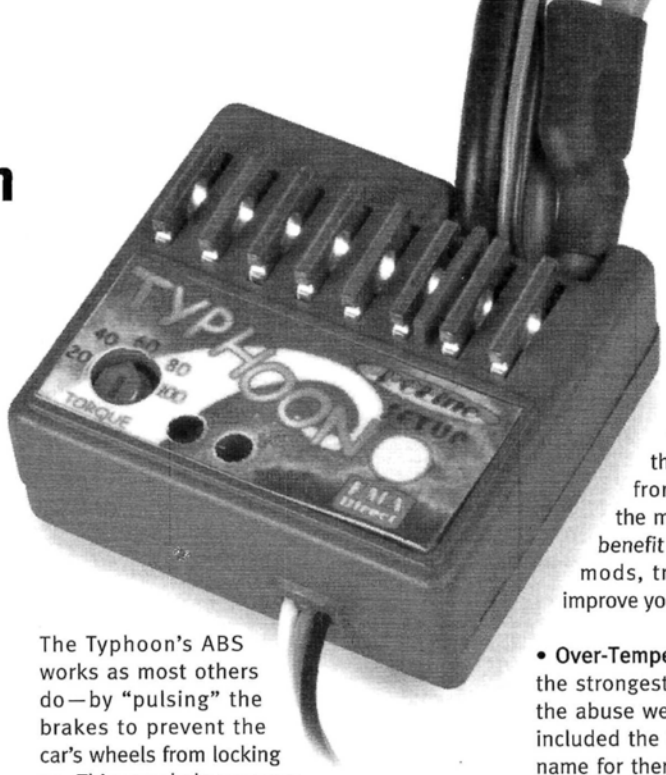
It looks as though there is yet another inexpensive, reliable peak charger on the market. Where were these chargers when I started? The Vision Peak charger makes it easier than ever to get a full charge into your packs. It's a no-brainer: push button; charge pack. Do be careful if you occasionally charge a NiMH pack, but otherwise, expect trouble-free Ni-Cd charging from the Dynamite Vision Peak charger.

—Peter Vieira

FMA Direct **Typhoon**

I think most racers will agree that there's plenty of demand for a full-feature racing ESC at an affordable price. To fill this niche, FMA Direct* created the Typhoon ESC. I had never heard of FMA Direct before, so I logged onto its website to do some investigating; there is also an online catalog of its products. FMA Direct is owned by Fred Marks, an experienced hobbyist and RC electronics guru. His online catalog includes receivers, servos, ESCs and chargers. I also visited some Web bulletin boards and found very satisfied FMA customers.

Now, I was eager to test this new speedo. At a lower price than many other similar ESCs, it includes racing features such as a high current rating and a push-button setup system. Let's see whether it performs as advertised.



The Typhoon's ABS works as most others do—by "pulsing" the brakes to prevent the car's wheels from locking up. This may help your car in situations in which you use heavy braking, such as during roadcourse touring-car racing. The Typhoon's ABS mode cannot be adjusted for pulse strength, frequency, or duration; your only options are to leave it on or off.

FEATURES

• **EZ Setup.** FMA Direct created a fairly simple push-button setup program called EZ Setup. The instructions to program the ESC were a little complicated, but actually doing it was a breeze. You just press the button on the faceplate and wait until the green LED blinks. From there, you pull the trigger all the way back and set your high point. A series of blinks cues you to apply full brake, and then you're ready to go. It sounds far more complex than it is; on its first run out of the box, I set up the Typhoon in about 30 seconds. This setup program is easier to use than some others and is as simple as those of the most popular models.

• **Anti-lock braking system (ABS).** During setup, you choose whether or not you want to use this feature, and it is easy to toggle between "regular" braking and ABS braking.

• **Current limiting.** On the Typhoon's face, a trim knob labeled "Torque" is your means of adjusting current flow from the ESC. Current limiting can help you retain control during hard acceleration and also help extend your run time. FMA Direct's current limiter prevents the large current spike that usually occurs when you punch the car out of the corner. This prevents your car from spinning out and helps keep the motor cool. Stock motors may not benefit from the limiter, but for low-wind mods, try using the current limiter to improve your lap and run times.

• **Over-Temperature Cutoff.** Sometimes, even the strongest speed controllers can't handle the abuse we throw at them. FMA Direct has included the Over-Temperature Cutoff (FMA's name for thermal overload protection) to prevent damage caused by overheating. If the Typhoon gets too hot, it will turn itself off before it melts. A thrown-out qualifier is much better then a melted speedo! I competed with this ESC for two weeks, and I enjoyed several evenings of mod speed runs on the parking lot. Thankfully, I never saw this feature kick in because the Typhoon barely got warm.

• **Other features.** The Typhoon includes plugs to suit the available receivers and a Schottky diode. The ESC comes wired with high-quality heavy-gauge wire. Because it is a racing ESC, no connectors are supplied, and FMA insists that you hard-wire it or use high-quality connectors. I hard-wired my motor to the Typhoon and used DuraTrax Powerpole connectors for the battery. A setup tool is not included, but as long as you have a small flat-head screwdriver, you'll have no problems adjusting this ESC.

Continued on page 190

SPECIFICATIONS

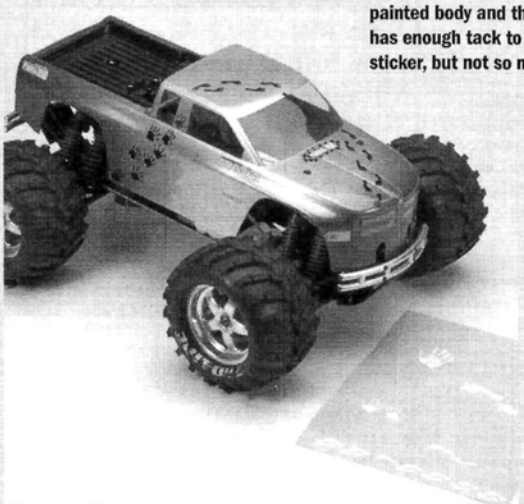
Size	1.64x1.50x0.80 in.
Weight	3.1 oz. (with wires)
Cells	4 to 10
Frequency	4KHz
On resistance	0.00116 ohm
Street price	$74.95

Parma **Dodge Ram T-Maxx body and paint mask**

With this new paint mask from Parma*, it will look as though somebody climbed up the side of your newly painted body and then walked across the top. The yellow vinyl has enough tack to prevent paint from bleeding beneath the sticker, but not so much that you can't remove the mask after it has been stuck down. The yellow mask is opaque, so you can also use the decals as stand-alones inside the body. Either way, these add a novel new look to even a one-color paint job. We tried the Hands and Feet mask on Parma's T-Maxx Dodge body. The Ram is Parma's latest direct-fit T-Maxx accessory. The fuel tank and engine cooling areas are embossed into the bed for removal if you choose, and a prepainted version is available, too.

Part no.—10810 (Hands and Feet mask); price—$4.79.

Part no.—10158 (Parma Dodge Ram, unpainted); price—$23.99; 10158P (painted); price—$41.99.



RAm **RC Ultra Brite Lites**

Ram's* new Ultra Brite Lites are only 5mm wide, but they illuminate a huge area and are visible in broad daylight. The light set includes a pair of high-intensity white LEDs that fit most popular aftermarket housings, or you can just poke them through the headlamp cutout of your RC body. To power the lights, we tried an electric car's 6-cell Ni-Cd pack and a 9V transistor battery while our body was on a nitro car; both worked very well.

Part no.—RAM 120.

Price—$24.95.

Continued from page 188

PERFORMANCE

The Typhoon looked like the perfect ESC for my TLo1 spec sedan. We run 6-minute races with heavy braking in the course's many corners, so the ABS feature looked as if it would be a real plus. After soldering everything together and going through the EZ Setup mode, it was off to the track. Throttle response was very smooth, and the brakes worked well. I programmed in the ABS function and ran a few more laps. It didn't take long to see that braking was now more effective. The pulsing action prevented the car from leaning into the turn too far and allowed me to drift through it more easily. These ABS pulses felt short and quick and prevented the wheels from locking. I think this feature really complements sedan racing.

At home, I decided to give the Typhoon a little more of a workout. Out came the silver-can stock motor and in went the modified. I ran many packs through the speedo with mods ranging from 11 to 14 turns. I decided to use the current limiter just to save my TLo1's gears, and it worked as advertised. The limiter also greatly helped to keep burnouts to a minimum. Set high, the limiter allowed full rip from the start; set low, it made my throttle control look smooth, even though I was still hammering on the throttle. At the lowest setting, top speed seemed slightly hindered, but not much. In the middle settings, which I later used exclusively, top speed was unaffected. This function is a great tuning aid for slippery tracks, hot motors, or both.

Likes

- Functional ABS system.
- Push-button setup.
- Stays cool.

Dislikes

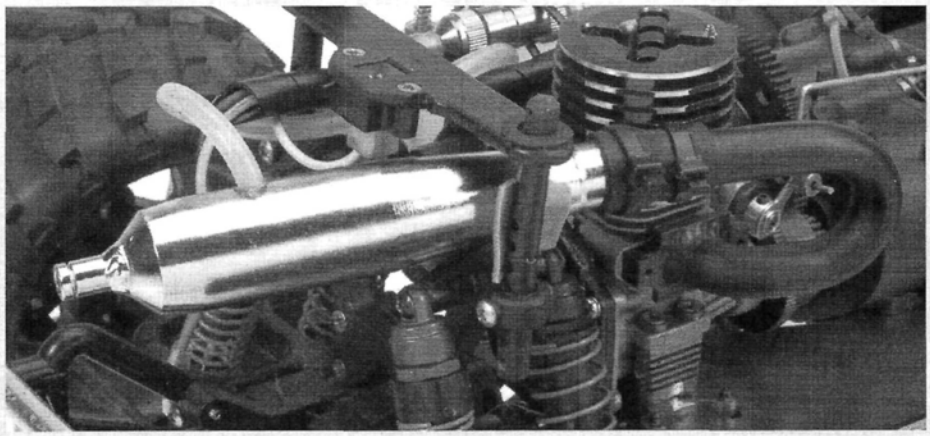
- Lame graphics.
- Instructions could be clearer.
- Setup tool is not included.

I did some braking tests with a mod motor and found that the standard braking stopped the car in about two thirds the distance of the ABS braking. Since toggling these two braking modes takes only about 5 seconds, you can switch between the two to see which one works for your track. The ABS's strong point was that the car did not drift sideways or lose traction when brakes were applied at full speed. After a pack's worth of heavy braking, the brake FETS were warm, but overall, the Typhoon stayed cool and smooth throughout my testing.

THE VERDICT

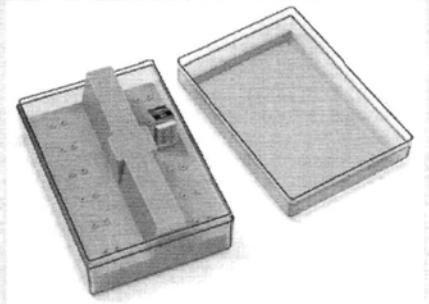
FMA Direct has put together a very good racing ESC. I think that the ABS braking is a real plus for many racers, and I'm confident it can handle the amp draw of today's motors. The Typhoon is an affordable and versatile choice for a racing speed controller.

—Zach Rohe



MIP **T-Maxx 360 Tuned Pipe**

Moore's Ideal Products (MIP*) has released its long-anticipated 360-degree header and tuned pipe for the Traxxas T-Maxx. The black header replaces the 90-degree factory unit with one that loops rearward. The brightly polished pipe runs beneath the body mount and exits the center of the tailgate. The exhaust looks great and definitely enhances performance over the stock parts. We like the MIP pipe's improved sound and that it blows the exhaust residue away from the truck.
Part no.—3074.
Price—$51.95.



KO Propo **Crystal Holder**

It doesn't take a whole lot to damage radio crystals. If you're like a lot of people I see, your extra frequencies are rattling around in your pit drawers like Chiclets in a box. KO Propo's* crystal holder is a much better alternative; it safely holds up to eight pairs of crystals within the smoked plastic container. The retainer has separate sections for TX and RX crystals and holds them snugly upright by their prongs; the translucent cover lets you see which channels you have with you without your having to open the lid. Even after aggressively slamming the KO crystal case, we were unable to "accidentally" dislodge any of the delicate electronics.
Part no.—71018.
Price—$10.95.

Raytek **MT4 MiniTemp**

Raytek's* new MT4 temp gun uses infrared and laser technology to provide quick temperature measurements. Squeezing the unit's trigger turns it on and activates a laser-sighting beam to show exactly where the infrared sensor is reading and instantaneously provide a temperature readout on the digital LCD screen. After a reading has been taken, it is displayed for 7 seconds and then the unit shuts off automatically. The screen can be backlit for use in low-light conditions. We found the MiniTemp to be most handy for nitro-engine tuning, but it has other uses, too; you can check your electric motor's temperature to see how gear-ratio changes affect it, check your touring-car tires after a run, check battery temps as they charge ... the list is endless.
Part no.—MT4.
Price—$99.95.

Team Orion **Shock Sledge Oil**

Team Orion's* new silicone shock fluid is sold in 1-ounce bottles, in 5WT increments from 20WT to 80WT. According to Orion, the fluid is 100-percent silicone and has been tested for accuracy of viscosity, and its anti-breakdown formula is said to maintain consistency. Sounds good, but we were most impressed by the bottle's narrow dropper tip that permits more precise filling and allows you to siphon the bubbles off the top of the fluid.
Part nos.—vary according to weight.
Price—$2 each.

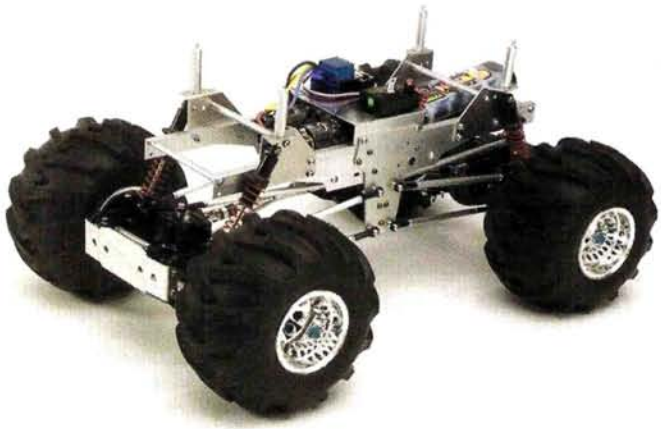
**Addresses are listed alphabetically in "Featured Manufacturers" on page 216.* ■

BY KEVIN HETMANSKI

ESP Team Juggular conversion kit

for the Tamiya Juggernaut

One of the most popular aftermarket monster-truck companies out there is ESP Hobby Mfg.*, best known for parts f the Tamiya* Clod Buster. ESP's popu ty and product line have grown trem ly through the years, but those of you who own Tamiya Juggernauts know that as far as chassis hop-ups go, little has been available ... until now. ESP is offering the Juggular chassis and a suspension upgrade kit for the Jug. The kit includes chassis stiffeners, shock towers and body mounts, long wheelbase four-link bars, a radio tray, machined-aluminum body posts, drive-shaft extensions and heavy-duty steering tie rods. The only parts from the original truck are the gearbox, complete axle assemblies, bumpers, servo-savers, aluminum chassis plates and drive shafts. You will also have to purchase a set of long, oil-filled, coil-over shocks. I just finished building my new ESP Jug; here's how it went together, along with a review of the completed Juggular truck's performance capabilities.



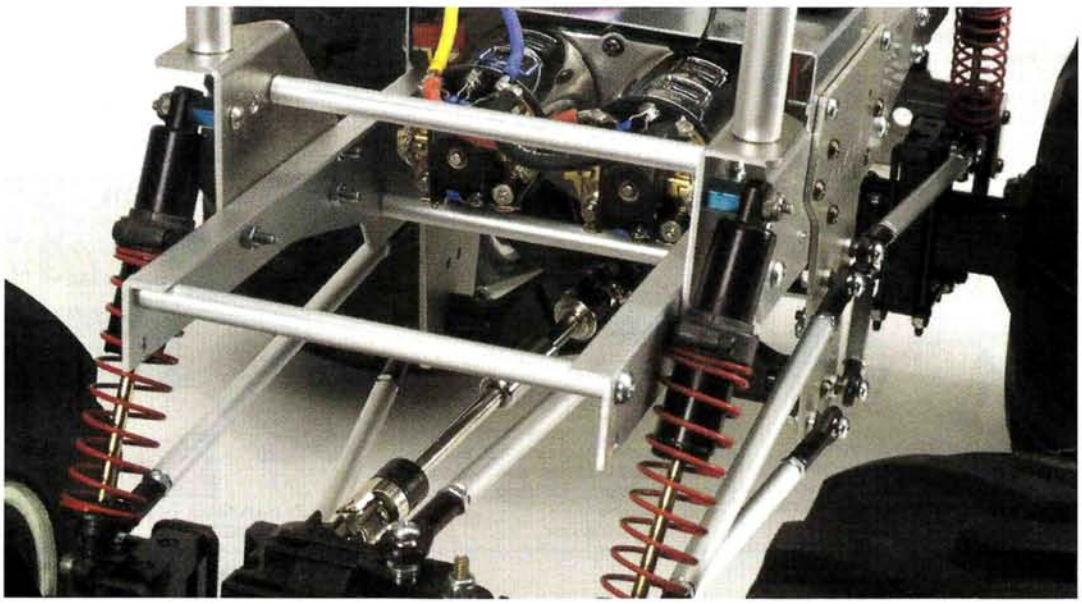
Here is the completed kit, and it looks ready to race! The longer wheelbase and large, oil-filled, coil-over shocks give the Jug the ultimate suspension.

CHASSIS

All of the plastic chassis components must be removed before you install any of the new ESP parts. The only stock chassis parts needed to complete the kit are the four chassis side plates and the gearbox. Four aluminum cross-members are attached to the chassis to make it more rigid. The two rear cross-members are used to attach the new battery tray; the battery is held onto the tray with zip-ties. An aluminum plate spans the top of the chassis; the speed control and receiver are mounted on it. All of the parts use existing holes on the chassis, so no drilling is necessary.

SHOCK TOWERS

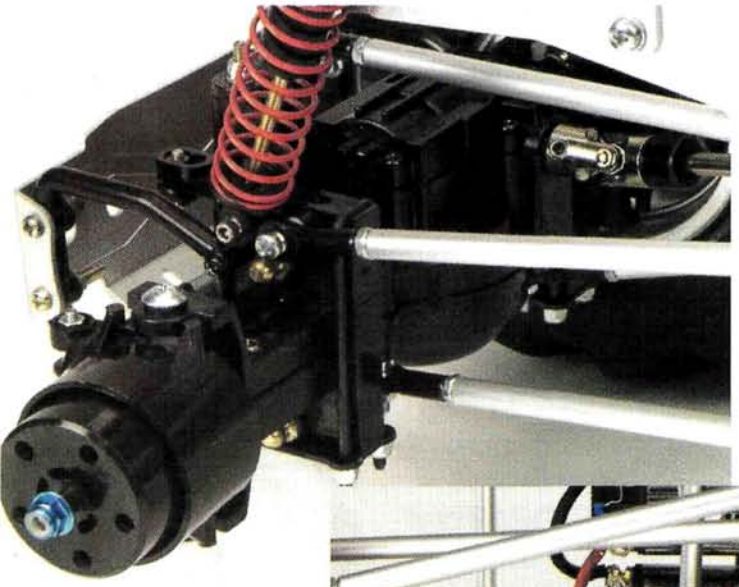
New shock towers are also included with the chassis upgrade kit. They're made of bent sheet aluminum, and each is held onto the chassis by three screws. Three mounting positions are available for the shocks, which are attached to the shock towers with screws and aluminum shock bushings. The bottoms of the shocks are attached to existing mounts on the axle. This setup raises the ride height of the chassis and gives the Jug more ground clearance. Cross-members span the shock towers using unused shock-mounting holes and make the chassis more rigid. The shock towers also have holes in the top so aftermarket body mounts can be used. This then permits the use of light-weight aftermarket Lexan bodies instead of the heavy, stock, two-piece "hard" body.



Six lightweight aluminum rods span the chassis. They help to stiffen the frame and give it that space-age look.

SUSPENSION

The stock swing arms, ball connectors, leaf springs, leaf-spring mounts and shocks must be completely removed from the stock truck to mount the new hardware. New aluminum rods with ball ends replace the stock plastic swing arms. These rods are much more rigid than the stock plastic ones, and this will help improve the performance of the suspension. The rods are also longer; they extend



Above: as you can see, little of the stock suspension is used on the Juggular truck. The aluminum rods attach to the axles without any modifications.

Left: if you look carefully at the right side of the drive shaft, you can see the drive-shaft extension. It is beautifully machined out of strong stainless steel.

the wheelbase of the truck from 11 to 14 inches (280 to 356mm). The added suspension travel improves the truck's handling, and a longer wheelbase improves it even more compared with the stock kit. The lower links are attached to the bottom of the axle near the output shaft. The upper links are attached to the axle using the extra shock-mounting hole left over from the original shocks. Both upper and lower links are attached to the chassis using the original suspension-mounting holes. Shocks are not included with the kit, but any long-stroke, oil-filled, coil-over shocks will work just fine. I bolted on a set of Losi* aluminum shocks filled with 20wt Associated* silicone shock oil. The springs that came with the shocks were a bit stiff for my taste, so I replaced them with Team Losi* gray springs.

DRIVE-SHAFT EXTENSIONS

Now that the wheelbase has been stretched, the stock drive shafts will no longer reach the axles. To solve this problem, ESP includes its new axle extensions in the kit. These extensions are precision-machined and ground using high-quality stainless steel. Just remove the fixed universal from the drive shaft, attach the extension, and reattach the universal to the extension. Setscrews and an Allen wrench are included with the extensions.

STEERING

Longer steering rods are included to reach the axles from the steering servo. Just like the four-link, they are constructed using aluminum stock and ball ends. The

SHOP TALK

I'm new to this hobby. My first car is a Traxxas Rustler RTR. I bought it about a week ago, and I'm having a blast with it! I just wanted to ask your advice on cleaning and lubricating it. I'm 14 years old, and I spent my own money on it, so I want to keep it in top condition, but I'm no mechanical genius. I drove it on a baseball field the other day and will probably drive it in the dirt a lot. How do I go about cleaning off the layer of dust over all the components and lubricating it for the next run with minimal disassembly? [email]
MATT

Matt, keeping your truck in tiptop shape is always important, and an easy way to do this is by cleaning it after every day of running. Electric vehicles are very easy to clean. When you have finished running it, take the body off, flip the car upside-down and give it a good shake (or two) to get most of the dirt out. Dust it off with a big brush or spray it with compressed air to remove the remaining dust and dirt. A toothbrush comes in handy to reach tight places. One place dirt often accumulates is around the bottom of the shocks where the shock shaft is. It is important to remove that dirt to prevent the rubber seals inside the shock from ripping and the shock shaft from being scored. Remove the motor from the truck, and give it a shot of motor spray to clean out any dirt that may have accumulated during your run. Relube your motor bearings or bushings with a high-quality bearing lube. Reinstall the motor, and you are ready for another run. After a month or so, it is a good idea to tear down the truck so you can look at all the parts to see whether they need to be replaced. Replacing a part before it has a chance to fail may save you money in the long run because when one part breaks, it often takes other parts with it. When you rebuild the truck, make certain the parts are as clean as they can be.

If you have any problems or questions about trucks, or if there is something you would like to see in "4x4," email me at kevinh@airage.com or send your letters to:
"4x4"
RC Car Action
100 East Ridge
Ridgefield, CT 06877-4606 USA

TRICK STUFF TRUCK

GPM machined-aluminum gearbox and axle tubes for Clod Buster

GPM* manufactures aluminum parts for most popular cars and trucks on the market, including the Tamiya Clod Buster. Here is just one of the many aftermarket parts it makes. The gearbox started out as a solid block of aluminum and was CNC-machined to fit the Clod Buster without modifications. The gearbox consists of three separate pieces. The motor mount is fully adjustable and allows the use of pinion gears of various sizes.

GPM also has aluminum axle tubes for the Clod. The gearboxes and axle tubes are impossible to break. Talk about bulletproofing your drive train! All the parts have been lightly sandblasted to remove the machine marks and give them a nice, satin finish.

Gearbox with adjustable motor mount–CB1012, $165.
Drive-shaft tube with C hub–CB1020, $120/pair.

A stock Juggernaut could never do this! The Juggular chassis kit makes the suspension far more supple, much like an ESP-modified Clod Buster. It's definitely a major leap forward for Juggernaut performance.

stock steering pieces on the axles are replaced by the same aluminum four-link rods that have been machined to the proper length. The sturdiness of the thick aluminum will enhance the truck's steering.

PERFORMANCE

I couldn't wait to hit the pavement with my now-converted Jug. What a difference! I installed the two Reedy 14-turn modifieds from my review of the stock Jug 2 (*Radio Control Car Action*, August 2000 issue), so I was expecting a huge, out-of-control wheelie when I mashed the trigger on my radio. To my surprise, the truck lifted the front left wheel only about 2 inches off the ground and took off. Although the truck did a good job of putting down power in a straight line, it had trouble staying hooked up in the turns. The Juggular chassis does not incorporate swaybars, so there's nothing to prevent the heft of the dual motors and battery from causing the suspended main chassis from flopping over as the truck corners. This causes the inside wheels to "unweigh," which allows the diffs to unload, and this scrubs off a lot of speed.

I was happy to find the Juggular much more capable in the rough stuff, which in this case was a pile of jagged rocks. I parked the Jug at the top and clamped it. My truck soaked up the rocks very well, as if they weren't even there. One very large rock stuck up at the top of the rock pile, and I launched my Jug off it. I was able to get at least 3 feet of air between the Jug and the ground, after which it settled quickly on touchdown and kept going. What a change from the stock suspension! I brought the truck back to my office and inspected it for damage; nothing was broken, but I noticed that a lot of the screws holding the suspension links to the chassis had loosened. If you build your own Juggular, be sure to use thread-locking compound on all the screws, and you should have no problems.

THE VERDICT

Not only do the suspension and chassis upgrade kits make your Juggernaut look outrageous, but this kit increases the overall performance of your truck, too. You will gain 8 inches of independent wheel travel and 2½ inches of up and down suspension travel depending on the length of your shocks. The free-moving axles will allow your shocks to work to their fullest. The longer wheelbase adds stability and makes it more difficult to flip the truck. Detailed instructions make assembly of these kits a snap, and all mounting hardware is included. This is just the beginning for ESP; the company is working on more aftermarket stuff for the Juggernaut, so stay tuned!

**Addresses are listed alphabetically in "Featured Manufacturers" on page 216.* ■

ADVERTISER INDEX

AAA Model Supply/ Dillon Racing, 202
ABC, 208
Ace Hardware Hobbies, 192-193
Action Hobbies, 215
Airtronics, 53
America's Hobby, 84-85,
Associated Electrics, 74-75, 106-107, 116-117,
Boca Bearing, 215
Bolink, 214-215
BRP Racing, 191
Bruckner Hobbies, 168-173
Calandra Racing Concepts, 202
Champion Hobbies, 104
Competition Electronics, 18
Conley Precision, 92
CVEC, 214
Deans, 62
Debbies RC World, Inc., 202
Duratrax, 45, 47, 167, 178, 217
Futaba Corp. of America, 126, 155, 210
General Silicones, 56-57, 66-67
Genka Trading Corp., 94-95
Global Hobbies, 143
H.P.I., 24-25, 86-87
Hammad Ghuman, 63-65
Hitec RCD, 39, 128, 160
Hobbico, 96
Hobby Shack, 180-185
Horizon Hobby Dist., 21, 161, 215
Hudy Special Products, 50, 73
JPS Products, 215
JT Racing, 191
Keyence, 142
Kondo Kagaku, 98
Kyosho, 28-33, 132, 141
LRP Electronic, 154, 162
Lunsford Racing, 210
M.D. Planes, 194-195
M.I.P., 48-49
Mach 1 Hobbies, 191
Megatech, 118, 140,
Model Rectifier Corp., 17,
Mugen USA, 129, 153
Nagengast, 191
National R/C, 175
New Era, 210
Niftech Precision Racing Products, 191
Novak Electronics, 23,
Ofna Racing, 19-20, 51, 55, 97, 127, 135, 159, 213
Omni Models, 203
Parma Intl., 163
Peak Performance, 177
Pro-Line, C3, 6-9,
R/C Car Kings, 187
Robins Racing, 210
Robinson Racing, 58-61
RPM, 93
Schumacher, 115
Serpent, 207
Sheldon's Hobbies, 200-201
Stormer Hobbies, 196-199
Tamiya, C2, 14-15, 42-43, 179
Team Corally, 99
Team Losi, 40-41, 105
Team Orion, 207,
Testor, 209
The Hobby Store, 191
Tower Hobbies, 139, 148-152, 212
Traxxas, 76-77, 108-109
Trinity, C4, 3-5, 10-13, 27, 34, 36-37
Ultimate Hobbies, 189
Varad/RC Neon, 104
WRAM Show, 211
www.rcbidnswap.com, 191
Yokomo USA, 78-79
Zip, 208

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FEATURED MANUFACTURERS

The following manufacturers' products are featured in this issue.

Airtronics
1185 Stanford Ct., Anaheim, CA 92805; (714) 978-1895; fax (714) 978-1540; www.airtronics.net.

Associated Electrics
3585 Cadillac Ave., Costa Mesa, CA 92626-1403; (714) 850-9342; fax (714) 850-1744; www.rc10.com; www.teamassociated.com.

Boca Bearing Co.
7040 W. Palmetto Park Rd., Ste. 2304, Boca Raton, FL 33433; (561) 998-0004; fax (561) 998-0119.

Bruckner Hobbies
3587 East Tremont Ave., New York, NY 10465 ; (718) 863-3434; (800) 288-8185; fax (718) 863-4002.

Conley Precision Engines Inc.
825 Duane St., Glen Ellyn, IL 60137; (630) 858-3160.

Deans
See W.S. Deans Co.

DuraTrax
Distributed by Great Planes.

Dynamite
4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511; fax (217) 352-0355; www.horizonhobby.com.

ESP Hobby Mfg.
129 Elizabeth Lane, Unit 4, Genoa City, WI 53128; (262) 279-0900; fax (262) 279-0972; www.esphobby.com; info@esphobby.com.

Fantom Racing
50201 Silver St., Vicksburg, MI 49097; (616) 649-9583; fax (616) 649-9584.

FMA Direct
9607 Dr. Perry Rd. #109, Ijamsville, MD 21754; (800) 343-2934; fax (301) 831-8987; www.fmadirect. com.

Futaba
Distributed exclusively by Great Planes Model Distributors Co., P.O. Box 9021, Champaign, IL 61826; www.futaba-rc.com.

GPM
Distributed by Hobby Etc. Inc., 90 West Pearl St., Nashua, NH 03060; (603) 595-8549; fax (603) 595-1498.

Great Planes Model Distributors
2904 Research Rd., P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948; fax (217) 398-0008.

GS Racing
650 W. Duarte Rd., Ste. 205, Arcadia, CA 91007; (626) 445-6036; fax (626) 445-6084; www.gsweb.com.tw; gsusa82@aol.com.

Hitec RCD Inc.
12115 Paine St., Poway, CA 92064; (858) 748-6948; fax (858) 748-1767; www.hitecrcd.com.

Horizon Hobby Inc.
4105 Fieldstone Rd., Champaign, IL 61822; (217) 355-9511; fax (217) 352-0355; www.horizonhobby.com.

HPI Racing
15321 Barranca Pky., Irvine, CA 92618; (949) 753-1099; fax (949) 753-1098; www.hpiracing.com.

Integy/Matrix Technology
1140 Centre Dr. #E, City of Industry, CA 91789; (909) 627-2713; fax (909) 627-4132.

Keyence Corp.
Higashinakajima, Higashiyodogawaku, Osaka, Japan 533-8555; 6-6325-6665; fax 6-6379-1190; www.keyence.co.jp.

Kimbrough Products
1322 Bell Ave., Unit 1-C, Tustin, CA 92780; (714) 258-7425; fax (714) 258-7426; www. kimbrough-products.com.

KO Propo USA Inc.,
16012 South Western Ave., Ste. 308, Gardena, CA 90247; (310) 532-9355; fax (310) 532-9354; info@kopropo.com; www.kopropo.co.uk.

Kyosho
Distributed by Great Planes Model Distributors, P.O. Box 9021, Champaign, IL 61826-9021; (800) 682-8948.

Losi (Team Losi)
Distributed by Horizon Hobby Distributors.

LRP Electronic;
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Lunsford Racing
2500 Three Lakes Rd., Ste. A, Albany, OR 97321; (541) 928-0587; fax (541) 967-5917; www.lunsfordracing.com.

Mabuchi Motor America Corp.
475 Park Ave. S., 34th floor, New York, NY 10016; (212) 686-3622.

MDP Inc.
22692 Granite Way B2, Laguna Hills, CA 92653; (949) 830-0304; order (800) 928-0304; www.nitrohouse.com.

Megatech
8300 Tonnelle Ave., North Bergen, NJ 07047; (201) 662-2800; www.megatechrc.com; info@ahcmegatech.com.

MIP
830 W. Golden Grove Way, Covina, CA 91722; (626) 339-9007; fax (626) 966-2901; www.miponline.com.

Model Rectifier Corp.
80 Newfield Ave., Edison, NJ 08818-6312; (732) 225-6360; fax (732) 225-0091; www.modelrec.com.

Motion Graphics
2645 Robert Arthur Rd., Westminster, MD 21158; (410) 848-0008; fax (410) 346-7440; www.motiongraphicsweb.com.

Motor Saver
24282 McCoy Rd., Lake Forest, CA 92630; (714) 455-0201; fax (714) 456-0249.

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Mugen USA
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Novak Electronics Inc., 18910 Teller Ave., Irvine, CA 92612; (949) 833-8873; fax (949) 833-1631; www.teamnovak.com.

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Power Master Hobby Products
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Raytek Corp.,
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Reedy Modifieds/Team Associated
3585 Cadillac Ave., Costa Mesa, CA 92626; (714) 850-9342; fax (714) 850-1744.

Robinson Racing Products
4968 Meadow View Dr., Mariposa, CA 95338; (209) 966-2465; fax (209) 966-5937; www.robinsonracing.com.

Rocket City R/C Specialties
103 Wholesale Ave. N.E., Huntsville, AL 35811; (256) 539-8358.

RPM Inc.
14978 Sierra Bonita Ln., Chino, CA 91710; (909) 393-0366; fax (909) 393-0465.

Sassy Chassis
1932 22nd Ave., Kenosha, WI 53140; (414) 551-8536; fax (414) 551-8566; www.sassychassis.com.

Schumacher USA
6302 Benjamin Rd., Ste. 404, Tampa, FL 33634; (813) 889-9691; fax (813) 889-9593; www.racing-cars.com.

Serpent Inc. USA
West Park Center, 2830 NW 79th Ave., Miami, FL 33122; (305) 639-9665; fax (305) 639-9658; www.hudy.net; info @serpent-usa.com.

Sullivan Products
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Team Associated
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Team Orion Inc.
22601 La Palma, Ste. 103, Yorba Linda, CA 92877; (714) 694-2812; fax (714) 694-2815; www.team-orion.com.

Traxxas Corp.
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Trinity Products Inc.
36 Meridian Rd., Edison, NJ 08820; (732) 635-1600; fax (732) 635-1640; www.teamtrinity.com.

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10875 Portal Dr., Los Alamitos, CA; (714) 828-6494; fax (714) 828-6252; deansco@earthlimk.net.

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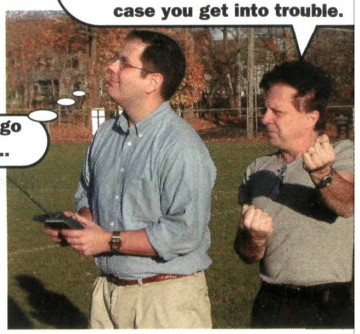
Airport Business Center, 17951 Skypark Cir., Ste. K, Irvine, CA 92614; (949) 252-8663; fax (949) 252-8657; www.yokomousa.com.

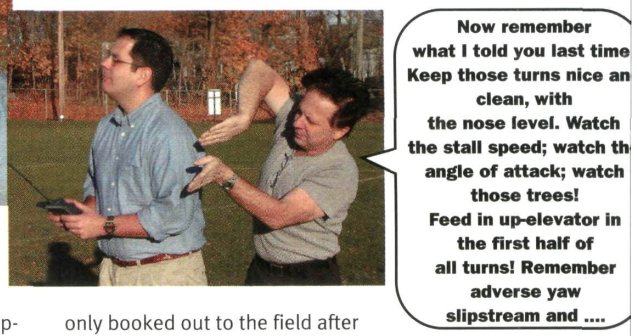
Chris's BACK LOT

The opinions expressed on this page do not necessarily represent the opinions of the entire *Car Action* staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o *R/C Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. My email address is: chrisc@airage.com.

BY CHRIS CHIANELLI

The challenges of being Chris





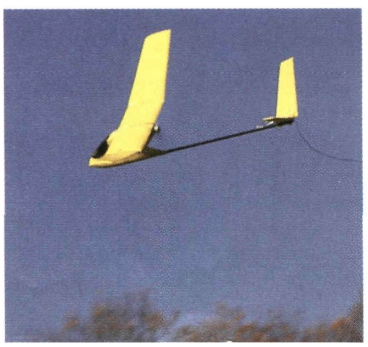
Over the years, I've had to overcome some serious challenges here at *RC Car Action* magazine. You guys have no idea! For example, every morning when I come to work, the first person I face is Diane, the happy receptionist. Now, we all love Diane; she's a lovely woman inside and out—except for one thing: she's cheery in the morning. Trust me; I realize this is *my* problem. But she says things like "Swell" and "Okey-dokey" and calls me "You little dickens." Do you have any idea how hard that is to take at 8:30 in the morning—before coffee? After about 10:30 a.m., when I've joined the living, she is one of my favorite people. If monks can survive lifetimes of austerity, then I can endure "Happy Diane" during my cranky morning hours.

Speaking of cranky, let me tell you about Steve Pond. When Steve first came into my life—many years ago—he thought it was just fine to replace nitro with Tabasco and olive oil when you ran out of fuel (or if you just wanted to save a few bucks). Let me say, it has been a long, hard road with Mr. Pond, but today (THANKS TO ME!!), Steve is not only a true nitro guru but also the executive editor of the very successful, high-quality and informative *Radio Control Nitro* magazine.

I could go on and on about EVERYBODY here at *RC Car Action*, but I'll spare you. Suffice it to say, the challenges have been vast over the years, but none have tested my patience more than trying to teach our lovable *RC Car Action* executive editor Peter Vieira how to fly an RC airplane. He thought flying into a 95-foot tree was just a pit stop. (Some of you will remember that incident.) Anyway, the future looked bleak for "Peter the Pilot." To tell you the truth, for the first time, I was ready to give up completely ... then I came across a product from Horizon Hobby Distributors called the Firebird. More than any other RC airplane I've come across, I feel that even those who have never before touched an RC plane can learn to fly with the Firebird. There can't be any wind, mind you; but that aside, the rank beginner can be successful with this airplane—even Pete.

Pete still wanted a copilot on his first mission with the Firebird, but I kept putting him off. Finally, he just went for it. I only booked out to the field after someone asked what Pete was doing outside flying an airplane! Flying successfully with zero instruction is the definitive litmus test for a great trainer. Pete will tell you—if *he* can do it, *you* can do it.

Seriously, if you guys do want to try your hand at flying, this little thing is the way to go. Everything you'll need to go flying—I mean everything—is included in the box, and if you can drive a car, you can fly this plane. ■



The Firebird is truly revolutionary—the easiest plane to fl *ever*. You're looking at the proof.